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$3.00 with Directory.

TEXTILE WORLD RECORD

The Autumn Convention

of the

National Association of Cotton Manufacturers

LORD & NAGLE COMPANY ~ BOSTON · MASS.

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Mercerizing Machinery for Piece Goods

— AND —

Yarns in the Warp or Chain

All Kinds of Outfits for Bleaching Thread and Soft Twisted Yarns.
Bleaching Machinery for Yarns in the Warp or Chain.

BLEACHING
DYEING
DRYING
AND
FINISHING
MACHINERY

Singeing Machines, Boiling Kiers, Washers Water, Chemic and Sour Squeezers.

Rusden Patent, Continuous Chainless Steamer, Aniline Agers.

Dyeing Machines, Open Soapers, Blanket Washers, Color Kettles, Horizontal or Vertical Drying Machines, with Copper or Tinned Iron Cylinders.

Water and Starch Mangles, Automatic Tentering Machines, Dyeing Machines for Chain Warps.

Dampening Machines, Calenders for Rolling, Glazing, Chasing and Embossing, also Calenders for Moire Finish.

Sole Manufacturers of Patented Flexible Cloth Expander for Cylinder Drying Machines, Calenders, Mangles, etc.

Combination Rolls made of Cotton and Husk, especially adapted for Soft Finish, Unequalled for Elasticity and Durability.

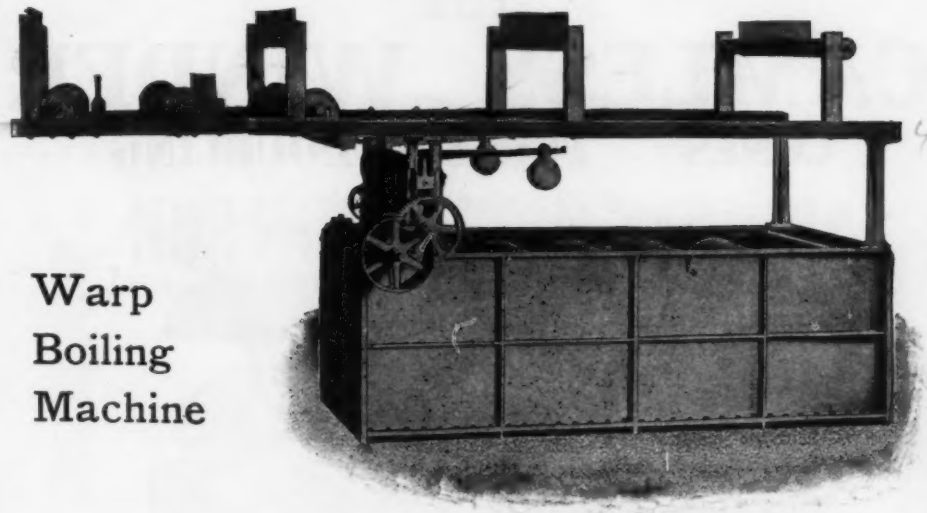
Cotton, Paper, Husk, Chilled Iron, Brass and Rubber Rolls, Electro-Deposited Copper Rolls for all purposes.

Padding and Drying Machines for Shade Cloths, Single and Double Cylinder Engines, Hydraulic Presses and Pumps.

Estimates, Drawings and full particulars of complete plants furnished on application

THE TEXTILE-FINISHING MACHINERY CO.

Howard Building, Providence, R. I.



Warp
Boiling
Machine

Bleaching,
Dyeing,
Drying,
Finishing
Machinery

for all textile fabrics.

H. W. BUTTERWORTH & SONS CO.

PHILADELPHIA, PA.

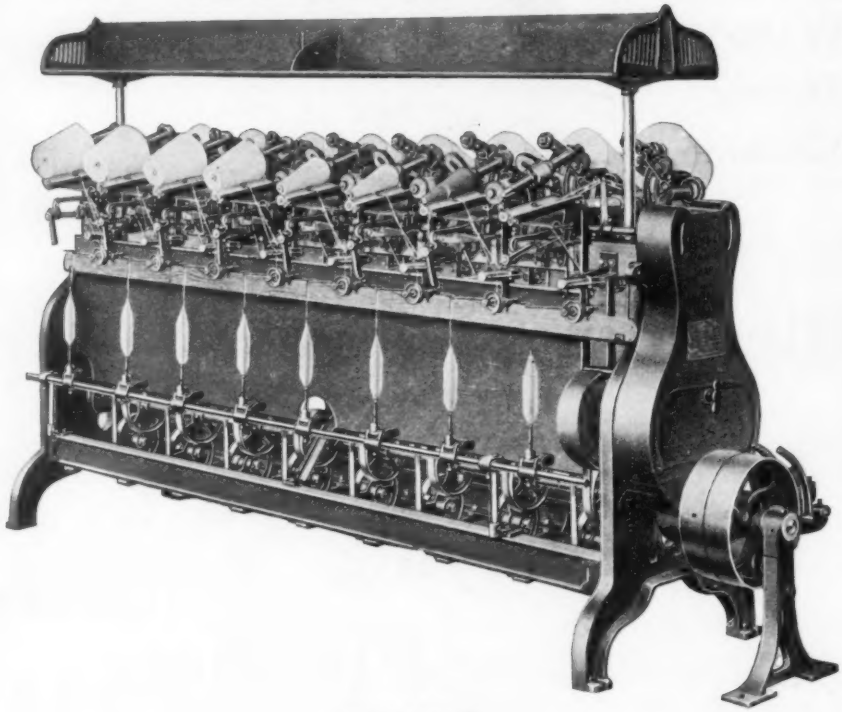
Providence Office, Room 417, Industrial Trust Building.

THE

CAMLESS WINDER

CONES TUBES DOUBLING

8000 Spindles Sold
From Jan. 1st to Sept. 1st.



1910 MODEL

ALL GEARS AND TRAVERSE PARTS
MADE FROM HIGH GRADE STEEL

You Must Remember

That the ORIGINAL and CORRECT New Taper Cone
Is Wound BY and ONLY BY the

CAMLESS

LOWELL MACHINE SHOP, LOWELL, MASS.

THE BEST

NORTHROP LOOM BOBBINS

ARE MADE BY THE NORTHROP LOOM MANUFACTURERS

All Bobbins are carefully inspected for fit on spindle, working limits in loom, and quality of material and workmanship.

The only place for poor bobbins is under the boiler.

DRAPER COMPANY

HOPEDALE, MASS.

J. D. CLOUDMAN, Southern Agent

40 SOUTH FORSYTH STREET : : ATLANTA, GEORGIA

THE EMPHATIC SUCCESS OF OUR "IDEAL" AUTOMATIC LOOM IS DUE TO SEVERAL SALIENT POINTS OF SUPERIORITY OVER ALL COMPETITORS:

1st. The ease and smoothness with which they start up.

2d. The acknowledged superiority of the cloth woven.

3d. Simple and thoroughly mechanical construction, assuring freedom from the constant breakage and expensive repairs attending other automatic looms.

4th. No special bobbins, shuttles or other expensive parts.

5th. Ability to use cop or bobbin filling interchangeably.

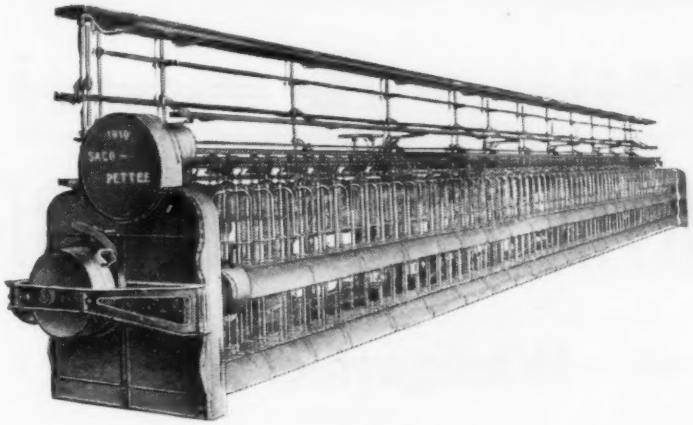
6th. Superiority of warp stop motion which does not break or fray the softest yarn.

7th. Of the thousands in operation not a single bobbin or crank shaft broken.

IN PROOF OF CLAIMS WE POINT TO THOSE MILLS FORMERLY USING OUR COMPETITORS' LOOMS THAT ARE NOW USING OURS.

The Stafford Company

Readville, Mass.



The New Improved Roving Frame,

illustrated above, is the culmination of much time and expense and is designed with a view to eliminating unnecessary parts, without detracting in any sense from the stability or effectiveness of the machine, all of which has resulted in the production of a Frame that expert mechanical skill has made as nearly perfect as possible. A RIGID, LIGHT RUNNING, EASILY CARED FOR machine, producing SUPERIOR ROVING at LOWEST COST for labor, to which we invite attention and comparison.

Descriptive Catalogue upon Application.

SACO-PETTEE COMPANY

SHOPS: Newton Upper Falls, Mass., Biddeford, Maine

Southern Agent, A. H. WASHBURN, Charlotte, N. C.

The

WHITIN MACHINE WORKS

Whitinsville, Mass.

BUILDERS OF

Cotton Machinery

CARDS	SPOOLERS
COMBERS	TWISTERS
DRAWING FRAMES	REELS
ROVING FRAMES	Long Chain Quillers
SPINNING FRAMES	LOOMS

Southern Agent:
STUART W. CRAMER,
Charlotte, N. C. and Atlanta, Ga.

"Kitson Products"

We have added a regulating device to our evener which is giving good satisfaction. This is patented by a Southern Mill man and we are the only concern handling same. The device allows the operative to see at a glance where his evener is working, and to adjust same without passing in between machines.

THE BRITTON EVENER REGULATOR

is now applied to all

KITSON FINISHERS

We are also prepared to supply the device for old machines which are equipped with PERHAM & DAVIS EVENERS.

Write for particulars and price.

Kitson Machine Shop

Lowell, Mass.

Ladies' tucked-top stockings are "easy" with our machines

Our automatic seamless hosiery machines turn out the popular tucked-top ladies stockings entire—foot, rib-top and all—in a continuous string as readily as they do half-hose. And the saving of labor-cost over the usual practice is even greater; because where a separate footer and ribber are used a two-feed machine is required for these tops.

One unskilled operator attends to 15 of our automatic machines; and simply supplies the yarn; while one adjuster or fixer looks after 75 to 100 machines.

The demand for these ladies' goods is great and increasing. And with our machines there is no difficulty in supplying it at a good profit to the manufacturer.

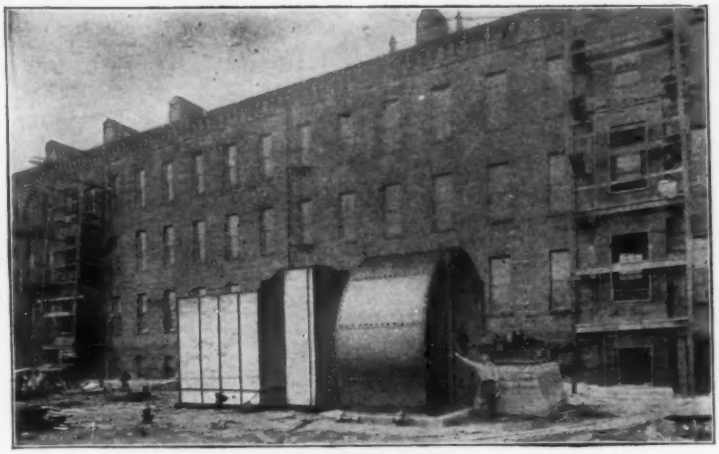
Wouldn't you like particulars?

Scott & Williams, Incorporated

Machinery for knitting mills

2079 E. Cumberland Street **Philadelphia, Pa., U. S. A.**

THE CARRIER SYSTEM



INDIANA COTTON MILLS

ONE APPARATUS FOR THE ENTIRE MILL
AUTOMATIC CONTROL OF TEMPERATURE AND HUMIDITY

The only system that is guaranteed to maintain the humidity during all seasons, regardless of all weather or temperature conditions.

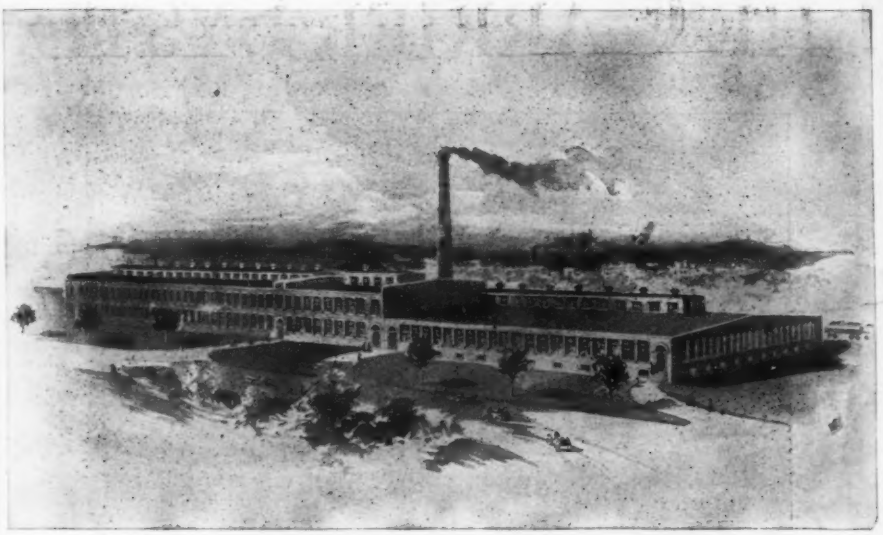
Mills Cooled to a Guaranteed Temperature in Summer

Although our system is new we have equipped, or have received orders for equipping, the following well known mills:

American Thread Company, Kerr Mill, Fall River, Mass.
Sagamore Mfg. Company, Fall River, Mass.
Brighton Mills, Passaic, N. J.
Ashland Cotton Company, Jewett City, Conn.
Sharp Mfg. Co., New Bedford, Mass.
Indiana Cotton Mills, Cannelton, Ind.
Albany Cotton Mills, Albany, Ga.
Sauquoit Spinning Company, Capron, N. Y.
Chronicle Cotton Mills, Belmont, N. C.
Lowell Cotton Mills, Lowell, N. C.
Peerless Mfg. Company, Lowell, N. C.
Walterboro Cotton Mills, Walterboro, S. C.
Eagle Spinning Company, Hamilton, Ont.
Wabasso Cotton Company, Three Rivers, Canada
Shawinigan Mfg. Company, Three Rivers, Canada
Dudley Shoals Cotton Mills, Granite Falls, N. C.
Lily Mill & Power Company, Shelby, N. C.
Farr Alpaca Company, Holyoke, Mass.—3 orders
Botany Worsted Mills, Passaic, N. J.—2 orders
Bradford Worsted Spinning Company, Louisville, Ky.
Gera Mills, Passaic, N. J.
Schlegel Mfg. Company, Rochester, N. Y.
John B. Stetson Company, Philadelphia, Pa.
Oswegatchie Mfg. Company, Buffalo, N. Y.
American Viscose Company, Chester, Pa.
Klots Throwing Company, Carbondale, Pa.
Duplan Silk Company, Hazleton, Pa.
Muller Gloria Mills, Winnipauk, Conn.
Klots Throwing Company, Cumberland, Md.
Huguet Silk Company, Wayland, N. Y.
Shamokin Throwing Company, Shamokin, Pa.
Susquehanna Silk Mills, Lewiston, Pa.
Klots Throwing Company, Scranton, Pa.
Shamokin Silk Company, Shamokin, Pa.
Klots Throwing Company, Archbald, Pa.
Fugi Silk Company, Fuji, Japan.

Carrier Air Conditioning Co.
OF AMERICA

(175-C) 39 CORTLANDT ST, NEW YORK



76 New Cotton Mills

have paid the compliment to Burt Ventilators by installing same during the last three years. Cotton mills need good ventilation above all things and they get it with the

Burt Combination Skylight and Ventilators

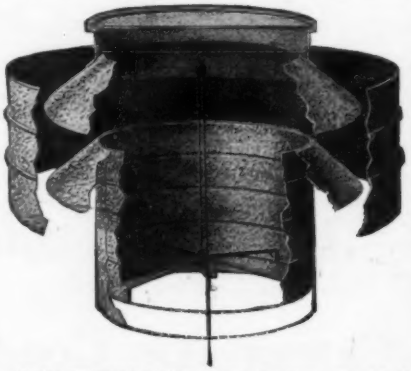
which are chosen because they are the best in material, workmanship and special features. The Burt is furnished with patented sliding sleeve damper which can be easily adjusted to any degree and damper is held firmly by means of a patented feature without tying same to hook, nail or post. When glass top feature is ordered ventilator can be closed without interfering with light. Guaranteed absolutely stormproof.

Send for our new 112 page catalogue.

The Burt Mfg. Co.

432 Main Street
AKRON, OHIO

Largest Manufacturers of Oil Filters and Exhaust Heads in the World.



Notice patented sliding sleeve damper. Furnished with flat wired glass up to and including 72 inch size. Also made with metal tops.

LEIGH & BUTLER

SUCCESSORS TO
EVAN ARTHUR LEIGH
232 Summer Street (opposite the South Station), Boston, Mass.

SOLE AGENTS

IN THE UNITED STATES AND CANADA FOR

Platt Bros. & Co., Ltd.

BY FAR THE LARGEST MAKERS IN THE WORLD OF

Cotton, Woolen and Worsted Machinery

Platt's Patent Opening and Picking Machinery.
Platt's Cotton Comber will comb from 7-8" stock to Sea Islands.
Platt's Special Machinery for Making Cotton Waste Into Yarns.
Platt's Special Machinery for Making French Worsted Yarns.
Platt's Woolen and Worsted Carding Engines, Special Designs.
Platt's Cotton, Cotton Waste, Woolen and Worsted Mules.

MATHER & PLATT, LTD.

Dyeing and Finishing Machinery.
Archbutt-Deeley System for purifying and softening water.

THE PATENT AUTOMATIC FEEDING MACH. CO., LTD.

Patent Feeding Machines for wool, cotton, flax, fur and fibrous material

JOSEPH SYKES BROS.
Card Clothing for Cotton.

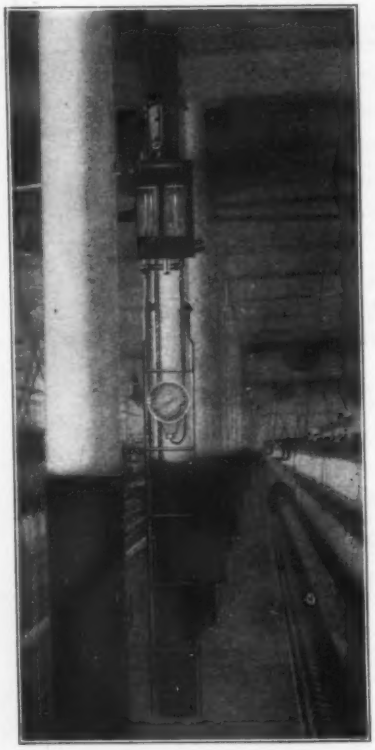
JAMES CRITCHLEY & SONS,
Card Clothing for Woolen and Worsted

WILSON BROS. BOBBIN CO.'S

Bobbins, Shuttles, etc.

Dronsfield Bros. Grinding Machinery and Emery Filleting. The Best French and English Combing and Rubbing Aprons. Harding's Pins and Circles. Varey's Fallers, etc.

AIR CONDITIONERS IN SPINNING ROOM.



AUTOMATIC REGULATOR MOUNTED ON COLUMN IN SPINNING ROOM.

Imitation is the Sincerest Form of Flattery, But—

Manufacturers are hereby warned against using infringements upon the Cramer patents for

Automatic Regulators

for Humidifying and Heating Systems and

Air Conditioners

of the Spray Type with Fans!

Before considering the purchase of infringing devices, make sure that the vendor is amply financially responsible and guarantees to indemnify the purchaser against loss by damage suits, for both infringers and users of infringments, however crude such infringments may be, will be prosecuted to the full extent of the law.

Don't be imposed upon by misleading terms and claims as to what the vendor's patents cover; anyone can get a patent for almost anything in the way of specific constructions; the vital question is whether or not such patents infringe other prior patents.

Cramer System of Air Conditioning

Vital Requirements for an Automatic Regulator:

(1) There must be *no wicking* on the wet bulb member *"to bother with and give trouble, and cause inaccurate indications."*

(2) Both the dry and the wet bulb members *must indicate actual temperatures that can be read*, that the alleged accuracy of the device may be checked up by the purchaser at all times.

(3) The materials of which the dry and wet bulb members are made must *be well known to be durable*, and permanent under the trying conditions of moisture and temperature changes.

STUART W. CRAMER

Charlotte, N. C.

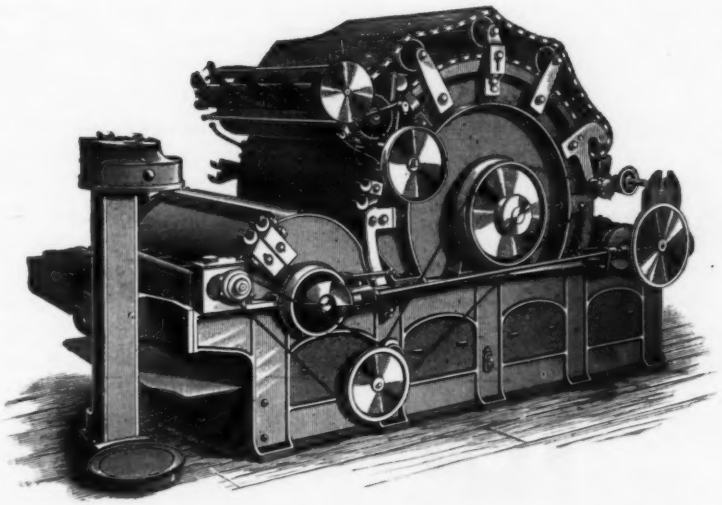
Providence, R. I. **Atlanta, Ga.**

Cotton Machinery

MASON MACHINE WORKS,

TAUNTON, MASS.

Southern Office,
Charlotte,
N. C.



Cards,
Combers, Railway
Heads, Drawing Frames
Spinning Frames, Mules and Looms

INCLUDING

Plain and Fancy Silk Looms

POTTER & JOHNSTON MACHINE CO.

PAWTUCKET, R. I., U. S. A.

SOUTHERN REPRESENTATIVE:

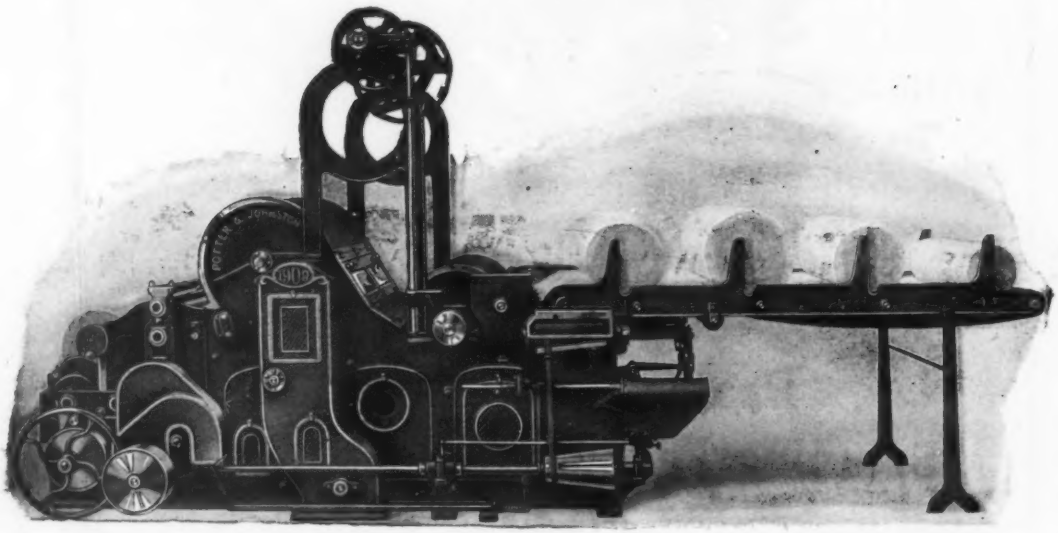
J. H. MAYES,

CHARLOTTE, N. C.

NORTHERN REPRESENTATIVE:

WM. MUIR,

PROVIDENCE, R. I.



SINGLE BEATER FINISHER.

Picking Machinery

MADE BY THE

POTTER & JOHNSTON MACHINE CO.,

has many new and valuable improvements, the workmanship and materials used are of the same high class as have characterized our products for many years.

Our textile machinery is made by the same tools and processes and with the same care and precision as enters into our machine tool work. The Beater and fan shafts are ground, all studs are case hardened and ground. High speed gearing is all cut, and fast running pinions are made of steel, cut, and case hardened. All medium and high speed bearings are ring oiling, the beater and fan bearings having been designed to overcome the trouble of oil leakage, which every carder knows has caused him serious annoyance by getting inside of the machine and onto the cotton, to say nothing of the cost of the oil. These bearings are oil-tight and neither allow oil to be drawn inside of machine or to leak outside.

The evener mechanism is so constructed that friction has almost been eliminated, and as a result, the slightest changes in thickness of laps will cause the necessary movement of the evener belt. This, of course, ensures an evenness of finished lap heretofore considered impossible.

Combined with the countershaft shipper handle is a locking device for the beater bonnet. This device locks the bonnet on starting, or if the bonnet is open the shipper is locked so that the machine cannot be started.

Improved forms of grid bars are used, the angle bars having milled knife edges, true and parallel to the edge of beater blade. The flat dust bars are made of sheet steel, and owing to their thinness are able to use over double the usual number and still keep the same space between bars and thus obtaining better cleaning action.

Between the cage stripping rolls and the lap head we have applied our patented Anti-Split rolls, which prevent split laps. There are two of these rolls, the lower one is composed of a series of steel disks on a shaft, which run in corresponding grooves in the upper roll, the cotton passing between them is corrugated lengthwise with small ribs which are pressed down by the calendar rolls into reinforced strips binding the sheet together.

The brake motion for the lap racks is adjusted by set screws for any desired friction, and change in same can be very quickly accomplished.

Everything about the machine is substantial, and in all its refinements none have been attained by a sacrifice of strength or ample wearing surface. We guarantee this picker to do better cleaning and evening with less cost for power, oil, and repair than any other machine on the market. The quality of the workmanship throughout is well illustrated by the fact that when running either idle or operating on cotton one can hardly tell from the sense of hearing that gears have any place in its construction, and the general appearance of the machine is such as to commend it to all who like nice lines and high finish in the machinery of their mills.

We have finished machines at our works that are at all times open for inspection, as well as our shop and manufacturing processes.

6502 Turbos

Paying Dividends
in these Plants

You Better Join the Turbo Family

Comparisons are odorous, but the Turbo-Humidifier has been disinfected. So it will stand 'em.

During the past two years there have been quite a few money-saving Turbo demonstrations.

Who was it that said there are lies, ——- lies, and statistics? I don't recall, but here are a few figures:

Did you know that there are 6,502 Turbos agitating the atmosphere?

In 98,830,400 cubic feet of mill space?

Did you realize that they unload a matter of some 78,055 gallons of Aqua Pura daily?

I didn't till I figured it out And did you ever stop to think of the amount some humidifiers would have to handle to equal the performance?

1,561,100 gallons. Think of it—20 times what the TURBO uses.

And why, do you ask? Well, some vaporize, at best, 5 per cent. of the water—and the Turbo vaporizes **all.**

And look at the list of satisfied Turbo users. Do you think these people bought 'em for souvenirs —in these Missouri times?

Oh, by the way, do you get the Fog Horn? It's about the Turbo.

If you don't receive it, let us know and we'll send it, and the Catalogue, too, if you haven't seen it.

The Turbo Family.

†Amoskeag Mfg. Co., Manchester, N. H.
†Columbian Mfg. Co., Greenville, N. H.
*Jackson Co., Nashua, N. H.
†Nashua Mfg. Co., Nashua, N. H.
†Wonalancet Company, Nashua, N. H.
*Hillsboro Mills, Wilton, N. H.
Massaemet Yarn Mills, Shattuckville, Mass.
Am. Worsted Machinery Co., Abington, Mass.
*†Renfrew Mfg. Co., Adams, Mass.
†Smith & Dove Mfg. Co., Andover, Mass.
†Boston Duck Co., Bondsville, Mass.
*Chicopee Mfg. Co., Chicopee Falls, Mass.
†W. Boylston Mfg. Co., Easthampton, Mass.
*Sagamore Mfg. Co., Fall River, Mass.
†Shove Mills, Fall River, Mass.
*Parkhill Mfg. Co., Fitchburg, Mass.
†Abbott Worsted Co., Forge Village, Mass.
Lawrence Duck Co., Lawrence, Mass.
*Nonotuck Silk Mills, Leeds, Mass.
†Merrimack Mfg. Co.,, Lowell, Mass.
United States Bunting Co., Lowell, Mass.
West End Thread Co., Millbury, Mass.
Warner Cotton Mills, Newburyport, Mass.
†Palmer Mills, Three Rivers, Mass.
*Boston Mfg. Co., Waltham, Mass.
†Warren Cotton Mills, West Warren, Mass.
*†Edwards Mfg. Co., Augusta, Me.
Pepperell Mfg. Co., Biddeford, Me.
York Mfg. Co., Biddeford, Me.
Goodall Worsted Co., Sanford, Me.
†Dexter Yarn Mills, Pawtucket, R. I.
*Fletcher Mfg. Co., Providence, R. I.
D. Goff & Sons, Pawtucket, R. I.
†Lorraine Mfg. Co., Pawtucket, R. I.
*Champlain Silk Mills, Brooklyn, N. Y.
†Fuld & Hatch Knitting Co., Cohoes, N. Y.
Standard Spinning Co., Oswego, N. Y.
Parsons Silk Throwing Co., Parsons, Pa.
Thos. Wolstenholme Sons & Co., Phila., Pa.
Wolstenholme & Clark, Philadelphia, Pa.
*†Dan River Power & Mfg. Co., Danville, Va.
*†Riverside Cotton Mills, Danville, Va.
†Martinsville Cotton Mills, Martinsville, Va.
†Cedar Falls Mfg. Co., Cedar Falls, N. C.
†Durham Hosiery Mill, Durham, N. C.
Travora Mfg. Co., Graham, N. C.
†Pomona Mills, Inc., Greensboro, N. C.
Hope Mills Mfg. Co., Hope Mills, N. C.
†Waverly Cotton Mills, Laurinburg, N. C.
Wennonah Cotton Mills, Lexington, N. C.
Marion Mfg. Co., Marion, N. C.
†Patterson Mills Co., Roanoke Rapids, N. C.
Cleghorn Cotton Mill, Rutherfordton, N. C.
Ella Mfg. Co., Shelby, N. C.
†Shelby Cotton Mills, Shelby, N. C.
†Turner Mills Co., Statesville, N. C.
†Taylorsville Cotton Mills, Taylorsville, N. C.
Belton Mills, Belton, S. C.
†Clinton Cotton Mills, Clinton, S. C.
†Globe Mills, Gaffney, S. C.
†Woodside Cotton Mills, Greenville, S. C.
†Newberry Cotton Mills, Newberry, S. C.
†Ninety-Six Cotton Mills, Ninety-Six, S. C.
Hamilton Carhardt Co., Rock Hill, S. C.
†W. S. Gray Cotton Co., Woodruff, S. C.
Perkins Hosiery Mills, Columbus, Ga.
†Milstead Mfg. Co., Conyers, Ga.
†Fort Valley Yarn Co., Fort Valley, Ga.
†Elm City Cotton Mills, La Grange, Ga.
†Unity Cotton Mills, No. 1, La Grange, Ga.
*†Unity Cotton Mills, No. 2, La Grange, Ga.
Manchester Mfg. Co., Macon, Ga.
*†Manchester Cotton Mills, Manchester, Ga.
Wahoo Mfg. Co., Sargent, Ga.
†Thomaston Cotton Mills, Thomaston, Ga.
†Verlina Mills, Jacksonville, Ala.
*Hamilton Cotton Co., Hamilton, Ont.

*Repeat orders. †Air cleaning in addition to Humidifiers.

TURBO TRADE MARK HUMIDIFIER

The G. M. Parks Company

FITCHBURG, MASS.

Southern Office, No. 1 Trust Building, Charlotte, N. C.
B. S. COTTRELL, Manager.

TURBO TRADE MARK HUMIDIFIER

The Whaleback

An Improved Piece-End Sewing Machine

Designed especially for piece-end sewing in Bleaching, Dyeing, Printing and Finishing Works, it holds the cloth taut in the piece during stitching, obviates narrowing-in of the ends of the piece thus saving in "shorts."

The **steel-spiked chain** follows the shape of the frame, over a **solid** bed. This insures steadier running and a **more even stitch** than is possible with spiked wheels running on carrier bowls.

The full width of the cloth may be fastened at once—saving both time and labor.

There is a special stripping arrangement with a cutter that trims the edges of the seam, to which an automatic tar-mark stamping device can be attached if desired.

A New Piece-End Sewing Machine

Embodying Some Very Great Improvements

It has a special steel link chain for the guide pins, taking the place of the objectionable solid ring. The ratchet motion is made in one solid piece, thus dispensing with troublesome set screws.

Neither loose threads or fluff can get into the bearings as the top shaft is enclosed.

The needle bar is square and works against a true milled surface.

The height of machine is adjustable, and there is ample space for working the treadle.

You can reduce your time and labor costs and get better work with this machine than with any other makes.

We are Sole Agents for The New Patent Pneumatic Beetle

F. T. WALSH, Manager

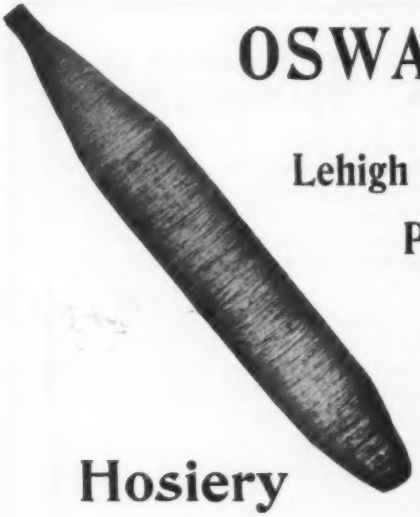
Thos. Leyland & Co., 60 India St., BOSTON, MASS.

OSWALD LEVER CO.

(INCORPORATED)

Lehigh Avenue and Hope Street

PHILADELPHIA, PA.



Hosiery Winders

To wind from the skein to the knitting bobbin in all sizes to suit any kind of yarn.

Cross Traverse Quillers

To wind direct from the skein or twister spool onto cops, butts, wood quills or paper tubes, to suit any grade of yarn from the coarsest of jute or duck to the finest of mercerized.

BUILDERS OF

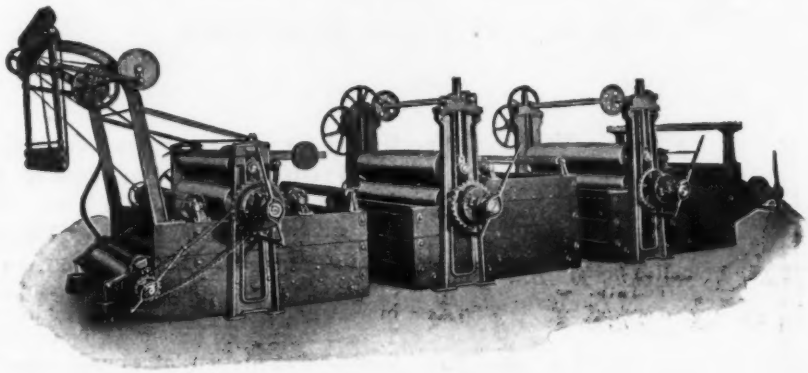
Textile Machinery

WINDING A SPECIALTY

JAMES HUNTER MACHINE CO.

NORTH ADAMS, MASS., U. S. A.

Crabbing Machine ***Bulletin No. 70***



The Hunter

3-SECTION CRABBING MACHINE

May be used as a CONTINUOUS Crabbing Machine. A One, Two or Three Bowl Crab—(Intermittent).—A Wet Rolling and Stretching Machine.

Any finish possible to obtain on any number, or any type of Crab, can be obtained on this ONE machine, and it will be much better and smoother.

Are you from Missouri?

Bulletin No. 70 "shows you."

American Textile Specialty Machinery Co.

670 Eddy St., Providence, R. I.

MANUFACTURERS OF

SHUTTLES AND SHUTTLE IRONS

FOR ALL TEXTILE PURPOSES

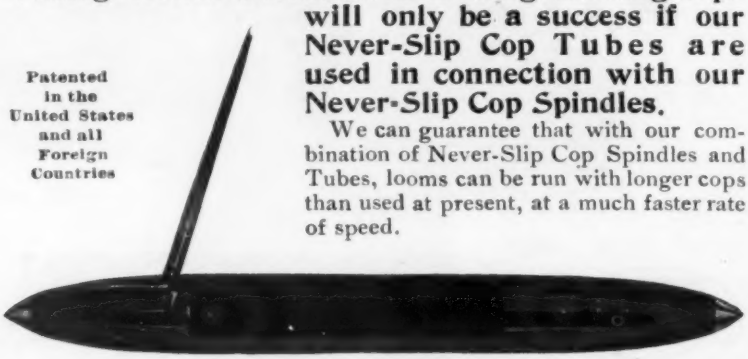
Never-Slip Cop Tube

Patent applied for

Filling-Waste is reduced to nothing and long Cops will only be a success if our Never-Slip Cop Tubes are used in connection with our Never-Slip Cop Spindles.

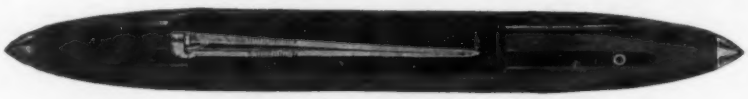
We can guarantee that with our combination of Never-Slip Cop Spindles and Tubes, looms can be run with longer cops than used at present, at a much faster rate of speed.

Patented in the United States and all Foreign Countries



Shuttle with Spindle Raised

U. S. Patents: 778851, Jan. 3, 1905; 790611, May 23, 1905; other patents pending



Shuttle with Spindle Lowered

U. S. Patents: 778851, Jan. 3, 1905; 790611, May 23, 1905; other patents pending

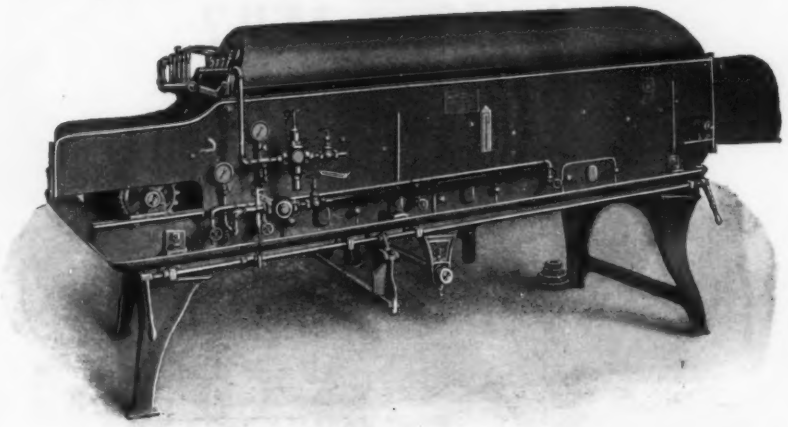
We also manufacture a complete line of

Paper Cop Tubes, Cones and Shells

Send your samples and we will quote prices on any lot desired.

New York Office, 363-373 Rider Ave.

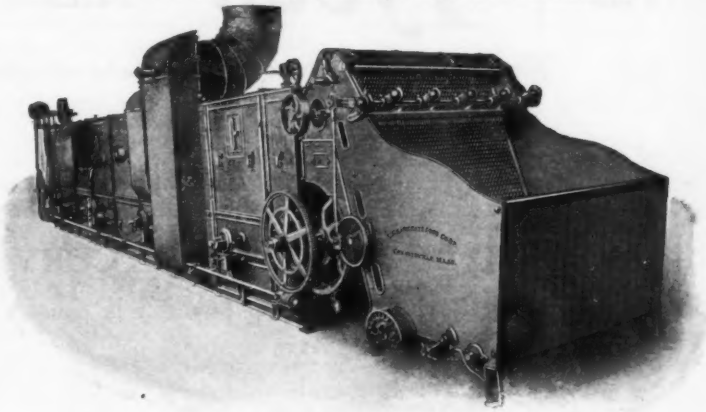
Yarn Conditioning Machine.



A Machine that Produces Results
An essential part of a modern mill equipment for uniformly conditioning yarns, without injury to bobbins
Absolutely controls the amount of moisture introduced into yarn

Sargent Drying Machines (fire resisting.)

Iron and Steel Construction, Asbestos Insulated.



For Cotton, Wool, Hair
Wool Washers, Wool Dusters and Openers
Carbonizing Dryers, Carbonizing Plants complete
Burr Pickers, Automatic Feeds for Cotton and Wool

C. G. SARGENT'S SONS, Corporation

GRANITEVILLE, MASS.

What is the Relative Humidity in Your Mill?

A GLANCE AT THE "Tycos" CURVES TELLS YOU

If you install a "Tycos" Hygrodeik, you will be able to tell whenever you want the information, just what percentage of humidity is actually present in your mill.

It won't be necessary for you to examine the "Tycos" Hygrodeik, then stop to figure out problems in percentage. The purpose of this instrument is not only to give you the information desired, but to figure it out for you.

ALL YOU NEED DO IS "READ THE CURVES"

from Wet Bulb to Dry Bulb. The percentage of humidity is pointed out at the bottom of the chart by the Index.

If our claims are true, you want "Tycos" Hydrodeik. Send for the bookle that proves they are true—it also tells considerable about humidity.

The Hohmann & Maurer Division

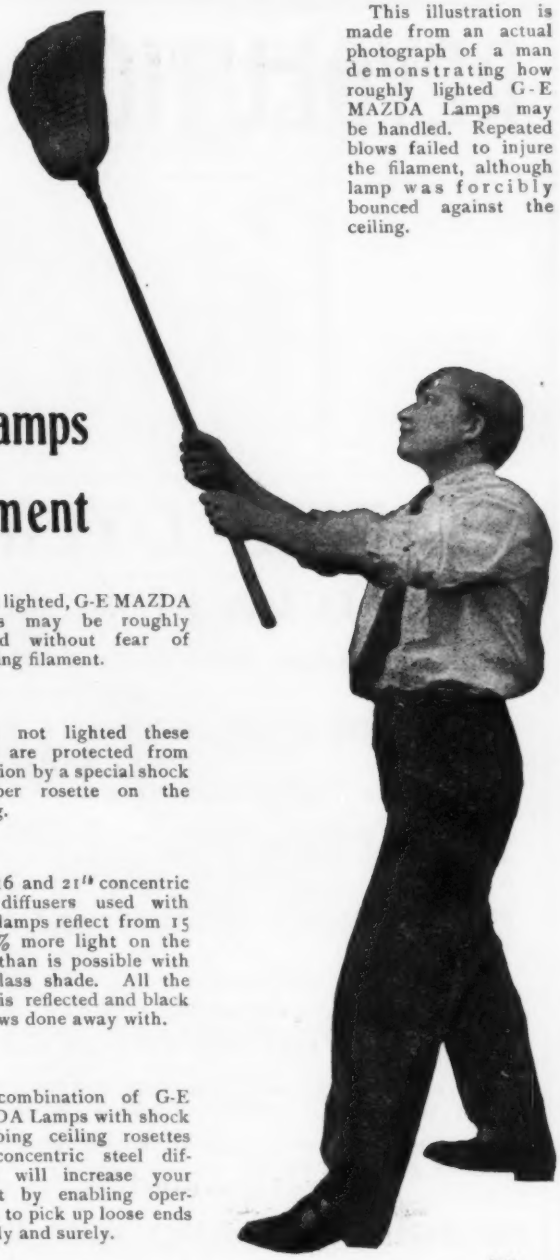
Taylor Instrument Companies - Rochester, N. Y.

"Where the Thermometers Come From."

NEW YORK
Bank of Metropolis Building
Broadway and 16th St.

BOSTON
44 High Street

CHICAGO
Heyworth Building
43 Madison Street



This illustration is made from an actual photograph of a man demonstrating how roughly lighted G-E MAZDA Lamps may be handled. Repeated blows failed to injure the filament, although lamp was forcibly bounced against the ceiling.

Sturdy G-E Mazda Lamps Stand Rough Treatment

For textile mill lighting G-E MAZDA Lamps have three characteristics that place them far ahead of all other illuminants.

1. They give three times as much light as ordinary incandescent lamps of the same current consumption.

2. They show colors nearer to real daylight values than any other type of electric incandescent lamps.

3. They will withstand any ordinary shock without breaking.

When lighted, G-E MAZDA Lamps may be roughly cleaned without fear of breaking filament.

When not lighted these lamps are protected from vibration by a special shock absorber rosette on the ceiling.

The 16 and 21" concentric steel diffusers used with these lamps reflect from 15 to 20% more light on the work than is possible with any glass shade. All the light is reflected and black shadows done away with.

The combination of G-E MAZDA Lamps with shock absorbing ceiling rosettes and concentric steel diffusers will increase your output by enabling operatives to pick up loose ends quickly and surely.

A Lighting Plan For Your Mill

showing size and location of lights for most efficient lighting will be furnished promptly without obligation to you if you write at once.

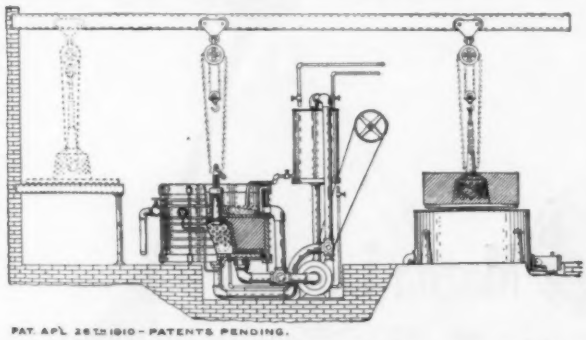
2603

General Electric Company

Mill Power Dept., Boston, Mass. **Principal Office: Schenectady, N. Y.**

Sales Offices in All Large Cities.

REVOLUTION - Elementally Different



PAT. APL. 26TH 1910 - PATENTS PENDING.

PSARSKI DYEING MACHINE

The Only All Around Perfect Dyeing Machine Built to Date

Great Production Great Saving in Labor—Dyestuffs—Steam and Water

PERFECT AND DEPENDABLE DYEING.
NO CHANNELS—NO SPOTTED BATCHES.

GREAT TRANSVERSE PRESSURE of 1 to 25 lbs. per square inch is automatically created by materials hard to permeate.

THOROUGH PENETRATION of dye liquor is thereby assured.

A GREAT BLEACHING MACHINE.—Bleaches 1500 to 2000 lbs. cotton per day.

A GREAT COLOR STRIPPING MACHINE.—Strips with approximately one-third of the agents used in other methods.

UNDER FAVORABLE CONDITIONS—Dyes 2000 to 2500 lbs. Wool per day—Acid colors.
Dyes 1500 lbs. Wool per day.—Top chromed colors.
Dyes 1000 lbs. Wool per day.—Bottom chromed colors.
Dyes 3500 to 4000 lbs. Cotton per day—directcolors.
Dyes 1500 to 2000 lbs. Cotton per day—Sulphur colors.

DYES PERFECTLY WITH THE NEW COTTON VAT COLORS.
DYES PERFECTLY AND EASILY WITH ALL THE WOOL COLORS.

DYES WORSTED TOPS WITH UNIFORM SHADE THROUGHOUT.
(No matting or felting. Consequently no extra noils in recombing.)

DYES HAT BODIES, ALL GRADES, UNIFORM PENETRATION THROUGHOUT.

DYES WOOL AND COTTON YARNS IN SKEINS, HANKS, BALLS, CONES, COPS, BOBBINS.

WOOL OR WOOLEN YARNS OR WORSTED TOPS ARE NOT MATTED OR FELTED.

YARNS AND SLUBBING are packed quickly and easily into machine.
(Need no pre-preparation or special building arrangement).

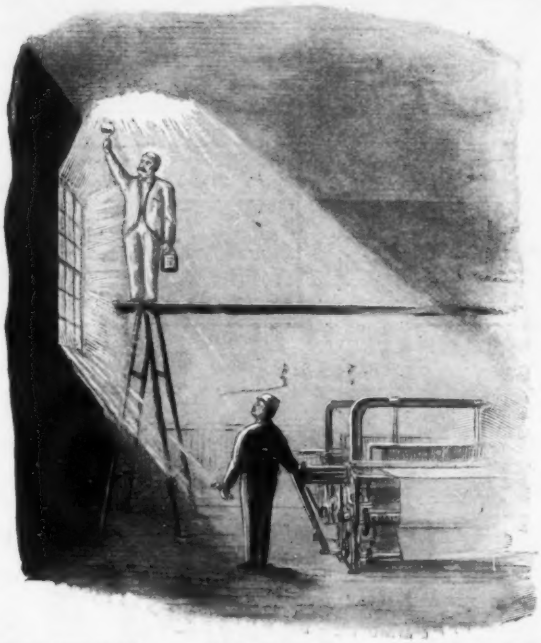
THE PSARSKI DYES ALL FIBRES—WOOL—COTTON—SILK—JUTE—FLAX—RAMIE

It is built by people who know how.

THE PSARSKI DYEING MACHINE COMPANY

3167 FULTON ROAD, CLEVELAND, OHIO.

COTTON MANUFACTURERS
Get LIGHT For YOUR Mill FREE



RICE'S MILL WHITE
Saves Light Money by Reflecting Light.

It is a positive waste of money that rightfully belongs to you and your stockholders if you neglect to utilize daylight to its full extent.

Dark, dismal walls and ceilings in your mill make it necessary for you to consume a great deal more artificial light than is necessary, for at an expense comparatively small, when the cost of gas or electricity is considered, you can make a very material reduction in your annual bill for artificial light.

Rice's Mill White can be applied to any wall or ceiling in your mill. Two coats of it will be found more durable and lasting than three coats of oil or lead.

Dust will not adhere to it, and when necessary it can be washed two and three times without injury to its surface.

It gives a good, hard, glossy surface that reflects all light that strikes it into every part of the rooms where it is used.

FREE TRIAL OFFER. We will send a gallon of Rice's Mill White free to any mill owner mentioning the Textile World Record and willing to pay express charges. Do you want to test this money saver?

U. S. GUTTA PERCHA PAINT COMPANY

(*Originators of Mill White Paint*)

Dept. A, Providence. R. I.

Two Big Fools

The Automobile Fool . . . That's Me
The Elevator Fool . . . . That's You

I went off and bought a "cheap" automobile at a "cheap" price—and got "properly stung."

You went off and bought a "cheap" elevator at a "cheap" price—and also got "properly stung."

I know what I think of Billy.

What do you think of the "Old Man?"

Say, let us two fools get together and form a Steam-Hydraulic brotherhood and get Powers, the New York Journal Artist, to draw us a coat of arms with our hands up and the slogan

"Never Again"

Listen, Mr. Mill Owner: The Ridgway Steam-Hydraulic Elevator is the Packard, Peerless, Lozier, Great Arrow, Cadillac of Elevators. If you don't believe it look at that list of present orders at the bottom of page.

Ask any of them and they will tell you things that will surprise you. These big concerns employ the best engineers in the world.

P. S. At a single "lick" we got the orders for elevators for Bureau of Engraving & Printing, United States Steel's big new plant and Standard Oil Company's plant at Bayonne, N. J. Don't you think a fellow like you ought to "set up and take notis?"

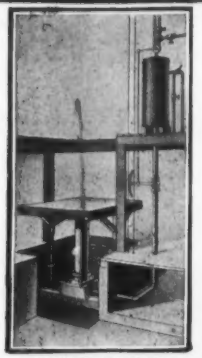
If you need an elevator, you are the **Unwisest of Men** if you don't get our circular and know this wonderful machine and find out why such world famous concerns

Hook 'er to the Biler.

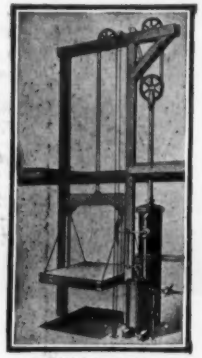
CRAIG RIDGWAY & SON CO.

COATESVILLE, PENNSYLVANIA

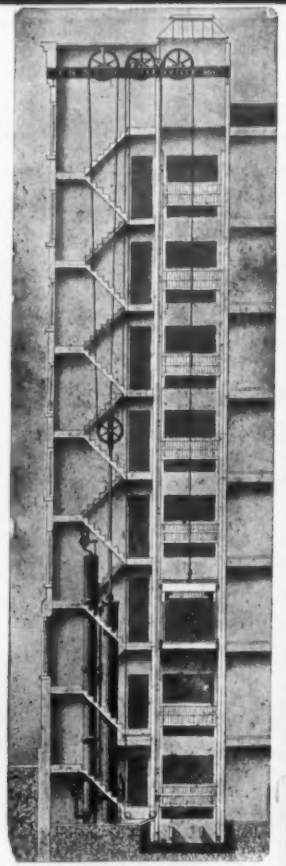
Elevator Makers to Folks Who Know



DIRECT ACTING



DOUBLE GEARED



In a big Soap Factory, Jersey City,

HOOKIN' 'ER TO THE BILER RIGHT NOW.

The United States Government
The United States Steel Co.
The Standard Oil Co.
Procter & Gamble Co.
General Electric Co.
Dodge Mfg. Co.
Standard Gauge Steel Co.
National Ring Traveler Co.
Schwarzschild & Sulzberger Co.
Buffalo Bolt Co.
Woonsocket Machine & Press Co.
Carpenter Steel Co.
Marathon Paper Co.
Neekoosa-Edwards Co.
F. A. Straus & Co.
W. A. Miles & Co.
Lawrence Bag Co.
LaCrosse Plow Co.
Bartlett, Hayward & Co.
Cluett, Peabody & Co.
Hall, Hartwell & Co.
International Harv. Co.
Packard Motor Car Co.
Joseph Benn & Sons
Shenandoah Abattoir Co.
Atlantic Screw Co.
Solvay Process Co.
Diebolt Safe & Lock Co.
Crane & Co., of Dalton
Advance Bag Co,
Bigelow-Harriman Co.
Orono Paper Co.
N. Drucser & Co.
Holbrook Mfg. Co.
John G. Woodward & Co.
Peoples Gas Co., of Chicago
Consolidated Gas Co.

and a dozen or two more no room for.

Starch

A Prominent New England Mill had been sizing warps with potato starch for 25 years.

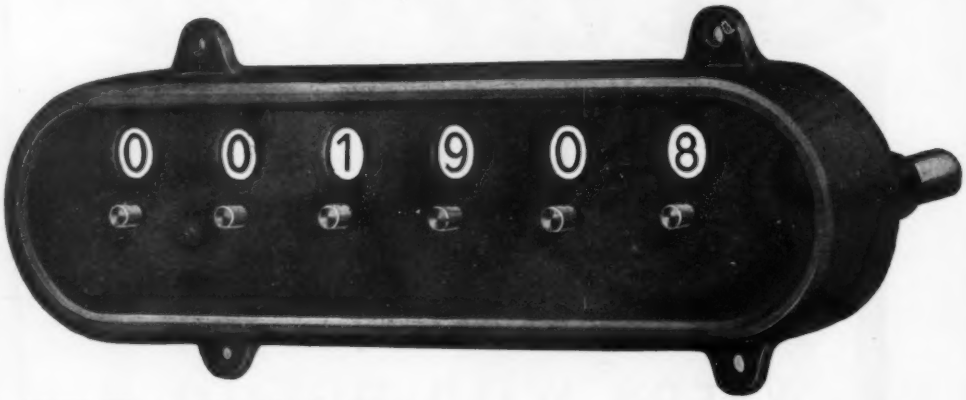
Tried our starch and was astonished at the results—smoother yarn and stronger, less breakage, quicker drawing in and tying in without stumbling, better separation, increased production.

If you want to know what we can do for your mill in better results and increased production write

CORN PRODUCTS REFINING CO.
NEW YORK

Starch

The ROOT LINEAR COUNTER



Will Keep You Informed

You want to know the capacity of your machines—you want to know what your employees are able to do—you want to know whether there is a waste of time, of energy, or of power—in short—of your money, due to the failure of men or machines to keep up to their full capacity.

It is the business of the Root Linear Counter to give you that information.

How It Counts

It registers the output of each machine with infallible accuracy, whether in hanks, pieces, yards, picks: in fact in any unit form.

Where To Use It

It can be used on looms, balling machines, twisters, dressers, folders, printing machines, rolling machines, etc.

Saving Raw Material

It shows at a glance just what your output is, and prevents unnecessary production, while insuring sufficient output, and therefore saves raw material.

Figuring Cost Estimates

Accurate cost estimates can be made by making daily comparisons of the productive capacity of employees or machines from the records obtainable with this machine.

The Root Linear Counter is extensively used in cotton mills and bleacheries, and it would pay you to write today for Catalogue No. 18 which gives more detailed information. If you will tell us just what your counting problem is, we will tell you just how to solve it.

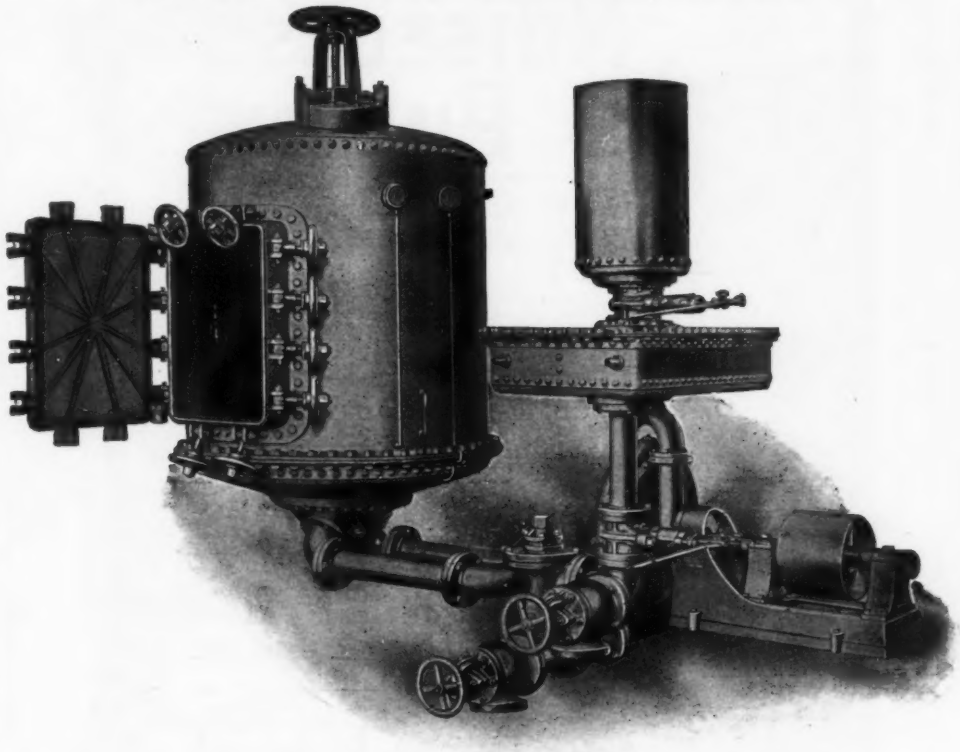
THE C. J. ROOT COMPANY

Bristol, Conn.

A COMPLETE DYE-HOUSE IN ONE MACHINE

Colored Goods Manufactured by use of same Winding Processes as Grey Goods

ELIMINATES SKEIN WINDING and WARPING



FRANKLIN DYEING MACHINE

(Patents pending in the United States, Canada and principal Foreign Countries)

For COTTON, WOOL and WORSTED YARNS

Dyes Cotton in the Lap—Wool in Card-Ball—Worsted in the Top

MACHINES IN PRACTICAL OPERATION IN MILLS DEMONSTRATE A

Saving of 25 to 30 % in Dye-Stuffs and 75% in Labor Cost

NO HYDRO-EXTRACTOR REQUIRED

FRANKLIN PROCESS COMPANY

P. O. Box 465 Providence, R. I.

F. E. ATTEAUX & CO., Inc., Selling Agents, 176 Purchase St., Boston, Mass.

NEW PROCESS NOISELESS PINIONS

N.P.R.H. REGISTERED

Are standard on many prominent American motors and machine tools.

Silent when old as while new, they offer economical and certain relief from the annoying clatter of metal-to-metal gearing. The cushioning effect of the rawhide also lessens destructive vibration, thus increasing the life and often improving the quality of product of the machine.

N.P.R.H. REGISTERED

THE NEW PROCESS RAWHIDE CO.

SYRACUSE N.Y.

THE SATURDAY EVENING POST September 17, 1910

Aerial Transportation

The Triplex Chain Block

The best chain hoisting machine, absolutely *safe*. Always holds the load automatically at any point. One man alone can lift the full load

THE lifting of loads is a universal need—a vital factor in every man's business. The Triplex Block is the simplest, safest, most efficient and most economical load-lifter in the world.

It lifts loads under all conditions in all places—from a palace to a sawmill—a garage to a warship.

When one man pulls on the hand chain of the Triplex Block, he can lift any load from 200 lbs. to twenty tons; two men can lift forty tons.

The load is always automatically held at any point during the lift. You can go away and let it hang ten seconds or a year. It will not come down until you are ready. Then you lower it by pulling lightly on the reverse side of the hand chain.

The Triplex Block has the strongest, simplest, smoothest-running, wear-resisting systems of gears ever devised to multiply lifting power.

It so multiplies the strength of one man as to make him master of every lifting problem.

Many loads must also be transported—moved horizontally. The Triplex Block not only lifts its load easily and holds it suspended safely, but when hung from a trolley running on an overhead track, the load may be moved easily wherever the overhead track goes.

One man can push the load as easily as he lifts it.

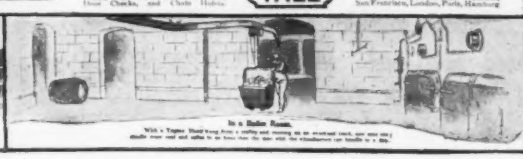
In foundries, machine shops, factories, sawmills, mines, quarries, warehouses—in power-houses and boiler-rooms—on railways, ships and docks—thousands of Triplex Blocks are daily lifting and transporting thousands of tons, at a saving in labor which frequently repays the whole cost of installation in six months. Everyone who has lifting and transporting to do should write for the book about Triplex Blocks. A postcard brings it.

Loading or Unloading

In a Warehouse

On a Farm

On Board Ship



In a Boiler Room

On a Garage

Three hundred dealers in the United States carry Triplex Blocks in stock. Wherever you are and whatever your problem—you may have a Triplex Block to try by just asking any one of them or by writing to us,

14 Sizes: One half a ton to forty tons.

The Yale & Towne Mfg. Co.

Makers of Yale Products
Locks, Padlocks, Builders' Hardware, Door Checks, and Chain Hoists.

YALE

9 Murray St., New York
Chicago, Philadelphia, Boston, San Francisco, London, Paris, Hamburg

The Triplex Block would prove itself a real necessity in thousands of places where it is not even known today.

This is why we spent $3,000 to print the above full-page advertisement in the Saturday Evening Post of Sept. 17th.

GUTTA-BALATA BELTING

TRADE-MARK

Has the least stretch of any belt made.

Either side can be run next the pulleys.

It is waterproof and runs successfully in damp places.

It is adapted for high speeds and for use where grease and oil come in contact with the belt.

All GUTTA-BALATA belts 4-ply and heavier are absolutely seamless.

Send for descriptive booklet.

RUBBER COVERED ROLLERS

NEW ROLLERS COMPLETE ROLLERS RE-COVERED

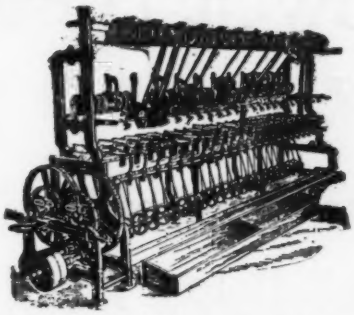
We furnish Rubber Covered Rollers for all purposes for which such rollers are or can be used in Textile Mills. The quality of our rubber coverings is rigidly maintained at its well known high standard — resulting in satisfaction and the greatest economy to the user.

BOSTON BELTING COMPANY

Boston	New York	Buffalo
Chicago	San Francisco	Portland, Oregon
Philadelphia	Baltimore	Atlanta

The Altemus Line

SOME THINGS I CAN DO FOR YOU



Below I give you but a hint of the many types of machinery and the textile service I can render you.

¶ Special Patent Bobbin Winders for Cotton and high speed production, unequalled in the quality of their work. They wind from the skein, cones, cops or spools, or rewind defective bobbins.

¶ My special machines for Worsted, Linen, etc., with the VARIABLE SPEED MOTION, wind from skeins or otherwise, without injury to the yarn. They are the greatest winders ever built, both for production and hard and compact winding.

¶ Patent Cop Winders for shuttle cops for heavy counts of yarn.

¶ Butt winders for winding medium yarns to take the place of bobbins for loom production.

¶ Winders for Hosiery and Sweater yarns of all kinds. Special Winders for Silk and Mercerized yarns.

¶ Spooling: I can handle the finest yarns for high speed production.

¶ Warping: My department for handling all kinds of yarns and fabrics is equal to the best.

¶ Beaming. I make all kinds of Beamers for converting warps into the desired condition for all purposes.

Information concerning many other kinds of machinery cheerfully furnished on request.

JACOB K. ALTEMUS

Textile Machinery

2824 No. 4th Street, Philadelphia, Pa.

T. C. Entwistle Co.

Lowell, Mass.

FRANK B. KENNEY, President and Manager

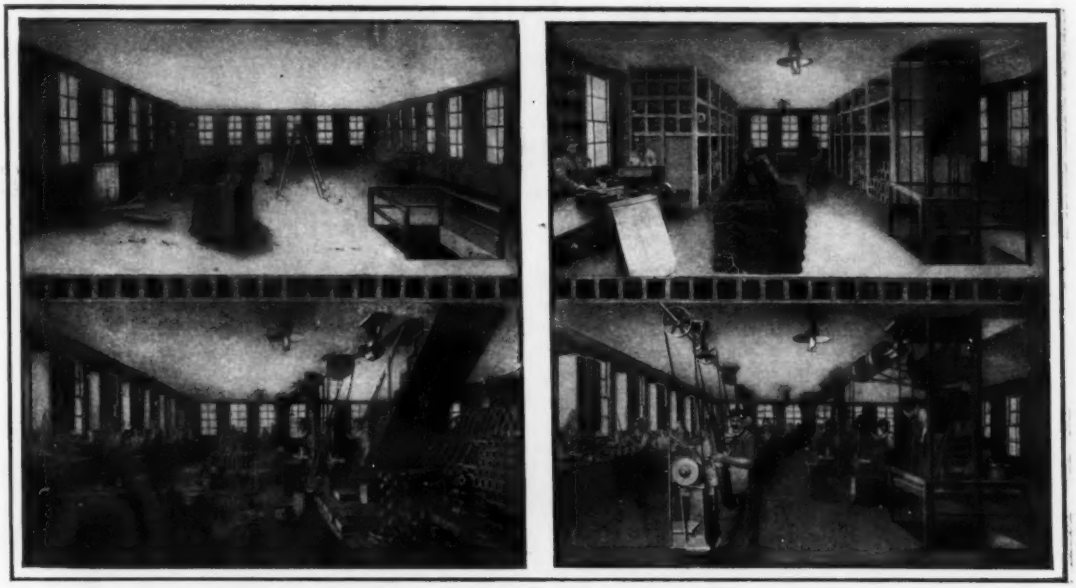
Textile Machinery of Real Quality
The Kind That Helps You Improve As
Well As Increase Your Output

Slasher Warpers
Ball Warpers
Beaming Machines
Expansion Combs
Traverse Wheel and
Long Roll Grinders

J. H. MAYES, Southern Agent, Charlotte, N. C.

Which Picture Shows

The State of Affairs in Your Factory?



Before Elevator was Installed. After Elevator was Installed.

The above illustration shows how a congested floor was relieved by the installation of an elevator, making available space for the installation of additional machines, thereby doubling the capacity of the plant and its value.

We can furnish an Otis Hand Power Elevator having a capacity of 1500 pounds for $75.00, or for $300.00 furnish an Otis Power Elevator to be connected to your present shafting.

Why not consider this small investment, which would not only relieve your manufacturing floor, but double its capacity, avoid unnecessary handling of material and give full value to all your upper floors.

We will gladly furnish any information desired regarding above.

Write to Department "S"

Otis Elevator Company

17 Battery Place, NEW YORK CITY

The Bristle Cloth STRETCHER

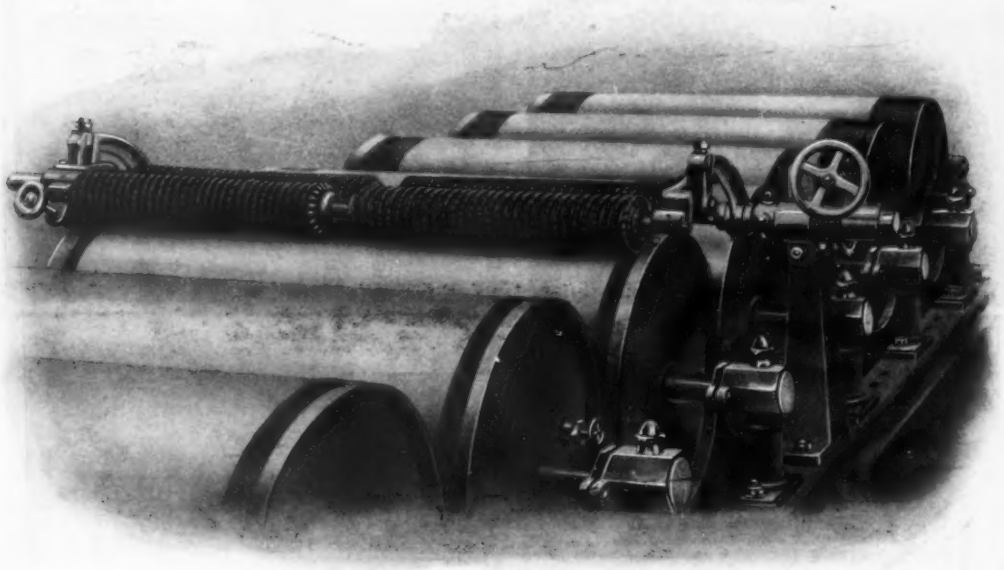
GETS THE FULL WIDTH DESIRED.

The Bristle Cloth WINDER

WINDS SOLID ROLLS FREE FROM WRINKLES.

The Bristle Cloth EVENER

EVENS THE GOODS BEFORE WINDING OR TENTERING.



AN IMPORTANT FEATURE as shown in the above illustration, is that this stretcher can be installed at **any point** on the drying cans so as to get the stretch at the **proper place,** namely:—**At the point where the cloth is commencing to dry,** so that it will **retain the width gained.**

Sold on approval.

AMERICAN FINISHING MACHINERY CO.

141 MILK STREET, BOSTON, MASS.

4 CANNON STREET, MANCHESTER, ENGLAND.

SELLS ROLLER BEARINGS

An Exclusive Sells Advantage

The steel split bushing which we use to prevent the shaft from being cut and worn by our case hardened steel rolls serves another equally important and economical purpose.

It is this:—

By varying the thickness of these bushings The Sells Roller Bearing can be bushed to different diameters of shafts as easily and practically as a split pulley.

Each size Sells is susceptible to three changes.

And the only expense is for the small cost of extra bushings.

The Sells is the only roller bearing that can be so bushed, and the enormous advantage of this to the user cannot be overestimated. He can change his shaft or adapt these bearings to different boxes as well.

Besides:—

Any Sells can be fitted to any hanger, post hanger or pillow block of corresponding size. And being split throughout is applied as easily as a split pulley.

The Sells has a self-contained roller structure which eliminates all friction between rolls and at the same time insures that they run parallel with box.

The Sells cost 50% less than any roller bearing and can be fitted in your entire plant at no expense for new equipment.

Will you find out just what we can save for you by signing and mailing us the attached coupon—right now before you forget?

Manufactured by

ROYERSFORD

FOUNDRY AND MACHINE CO., Inc.,

MANUFACTURERS OF

Power Transmission Machinery and Punching and Shearing Machines,

56 N. FIFTH STREET
PHILADELPHIA, PA.

COUPON

ROYERSFORD FOUNDRY AND MACHINE COMPANY, Inc. Phila., Pa.

Gentlemen:—Replying to your ad. in Textile World Record, Oct., send me booklet and all information regarding Sells Roller Bearings.

Name.....

Firm.....

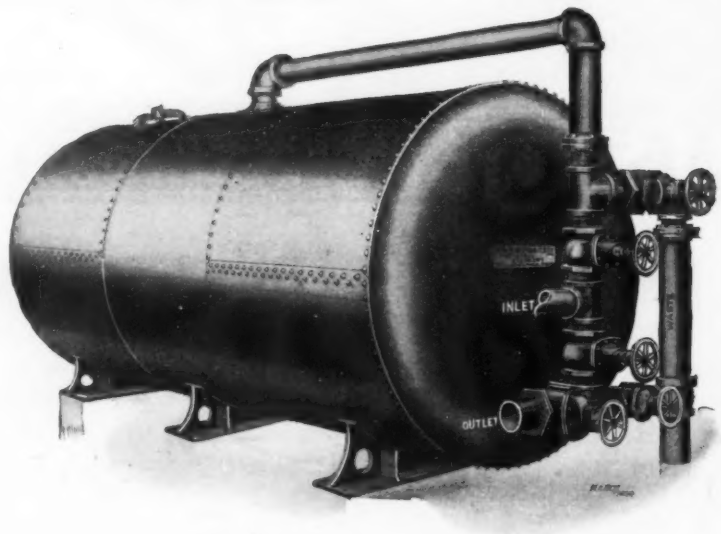
Firm Address.....

Business.....

Bearings now in use.....

HUNGERFORD & TERRY, Inc.

FILTERS



HORIZONTAL PRESSURE FILTER

A PROMINENT BLEACHER WRITES:

"The installation of a battery of Hungerford Filters has produced exactly the results in our bleaching process that we had hoped to attain when we decided to try the effect of filtration of our water supply." Another: "Since your apparatus was installed we have not had a pound of rebleach that we could trace to the water." The largest firm of finishers in Philadelphia writes: "We have had filters of different makes, but must say this is the best one we ever purchased and the only one to give us the guaranteed quantity of water." Another manufacturer writes: "We can say without hesitation that the fine finish and brilliant whites that we are enabled to get are due entirely to the good offices of your filter." Another one: "We believe that we are getting fully thirty per cent. more water through your filters than your guarantee calls for, and only in the muddiest of the James River water do we have to use alum." Still another: "In the five years we have run the filter we have never had cause to remove the manhole cover."

Last month we moved one of our million gallon gravity filters which had been in continuous operation since 1902. Not one dollar had been spent on this filter in the intervening years, yet the sand was as clean and as fresh, and the capacity and efficiency of the filter were just as high as when first installed.

This is the kind of filter the successful textile manufacturer uses.

A FEW CUSTOMERS

Bellman Brook Bleachery, Fairview, N. J.,	2,000,000	gals.	per day
Dan River Cotton Mills, Danville, Va.	2,500,000	"	" "
Newburgh Bleachery, Newburgh, N. Y.	6,000,000	"	" "
Revolution Cotton Mills, Greensboro, N.C.,	1,300,000	"	" "
Dominion Textile Co., Montreal, Canada,	2,000,000	"	" "
Cluett, Peabody & Co., Troy, N. Y.	3,400,000	"	" "
Great Falls Bleachery, Somersworth, N. H.	300,000	"	" "
Cliffside Mills, Cliffside, N. C.	1,000,000	"	" "
Mohawk Valley Cap Factory, Utica, N. Y.,	500,000	"	" "
Avalon Knitwear Co., Utica, N. Y.	500,000	"	" "
The Arlington Co., Arlington, N. J,	1,000,000	gals.	per day
Welsbach Light Co., Gloucester, N. J.	1,000,000	"	" "
Weidmann Silk Dyeing Co., Paterson, N.J.,	9,000,000	"	" "
National Silk Dyeing Co., Paterson, N. J.,	10,000,000	"	" "
Vesta Knitting Mills, Providence, R. I.	100,000	"	" "
Piqua Bleach & Dye Works, Piqua, Ohio	100,000	"	" "
Am. Silk D. & F. Co., Hawthorne, N.J.	2,000,000	"	" "
Victoria Plush Mills, Lenni, Pa.	400,000	"	" "
Frank F. Pels Co., New Durham, N. J.	200,000	"	" "
Stroock Felt Co., Newburgh, N. Y.	2,600,000	"	" "

HUNGERFORD & TERRY, Inc.

Engineers and Manufacturers of Water Filters

PENNA. BUILDING, PHILADELPHIA, PA.

FIG.22.

LANE

Patent Steel Frame

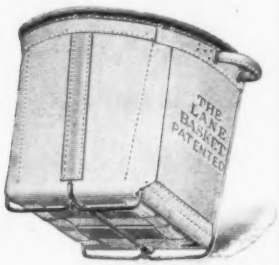


FIG.39

Canvas Mill Baskets, Boxes and Trucks.

Designed to Fulfill All the Requirements of Textile Mills in a Manner Superior to Any Other Basket

Fifteen years of steadily increasing use in Leading Mills attests this fact.

FIG.20.

Made of extra quality, extra heavy weight cotton duck, with indestructible frame of round spring steel, and combining to the highest degree, light weight, smoothness, necessary flexibility, durability, etc.

Used by leading Textile Mills for the past fifteen years.

Sold direct and through all leading Mill Supply Houses.

MANUFACTURED BY

W. T. LANE & BROTHER

FIG.27

Office and Works,

Poughkeepsie, N.Y.

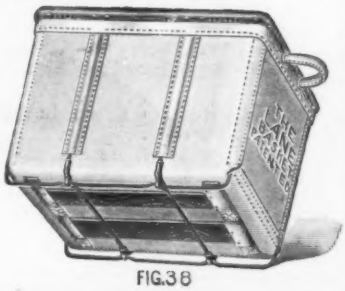


FIG.38

Why Waste Your Light Money?

KEEP THE LIGHT YOU PAY FOR WHERE IT IS NEEDED.

DO NOT HAVE IT RADIATE WHERE IT DOES NO GOOD.

GROUP P
For Localized Lighting

GROUP D
For General Illumination

Wheeler Para-Steel Reflectors.

The majority of textile mills are wasting money for electric lighting in either one of the following ways:

1st—They are not using reflectors of the proper shape for their purpose, hence the light that should be concentrated where needed radiates to where it serves no purpose.

2nd—The reflectors they are using may be of the proper shape, but the inside surface is of such material or finish that it accumulates fluff, dirt and grime to such an extent as to deaden the light and change the contrivance used from a **"reflector"** to a mere localizer of light; or the surface finish is so inadequate that when the reflector is used in dyeing and bleaching establishments the moisture and acid fumes cause deterioration and corrosion of the reflector.

Is was to overcome these difficulties that Wheeler "Para-Steel" reflectors were designed. Reflector "Group P, for Localized Lighting," is designed to give to the operatives all the light thrown off by the lamp to which it is attached. None of the light is wasted—all of it is thrown directly on to the loom, work-bench or machine, where light is needed. Where lighting is desired over wide areas and arc lamps are undesirable, "Group D" reflector "for General Illumination" is exceptionally good, throwing the light downwards and outwards at a wide angle.

Besides giving the highest possible lighting value, Wheeler "Para-Steel" reflectors are of greater durability than other reflectors, as they have an inside coating of porcelain enamel, which in addition to being impervious to moisture and acid atmospheres, has such a glazed surface that it collects comparatively little fluff and dirt, and therefore really **reflects,** instead of deadening, light.

Send for descriptive bulletin demonstrating the higher lighting efficiency of Wheeler "Para-Steel" Reflectors.

Wheeler Reflector Company

156 Pearl Street, Boston

TEXTILE OILS

Wool Oils: **"BRETON"** BRANDS—used for over a quarter of a century. Stand today, ***"Peer of all Wool Oils."***

Loom Oils: **"PARAGON"** BRANDS from "Water-white," for finest work, graded down to suit every requirement, insuring satisfactory and economic results.

Spindle Oils: Made for every class of spinning devices, from highest speeded spindle, down. Strictly neutral and absolutely uniform.

High Grade LUBRICATING OILS for every condition.
RUB ROLL, APRON, TOP ROLL OILS, etc.

Sufficient oil of any kind sent subject to "test and approval."

BORNE, SCRYMSER COMPANY

80 South St., NEW YORK

BOSTON FALL RIVER PHILADELPHIA

Works, Claremont, Jersey City, N. J.

SMITH, DRUM & CO.

"BUILDERS OF THE BEST"

Labor Saving Machinery for Dyeing, Singeing and Finishing

HOSIERY

IN SULPHUR, ANILINE, DEVELOPED BLACKS AND COLORS
POWER SCREW PRESSES and MERCERIZING MACHINES

SAVE LABOR and **DYE STUFF** and do **BETTER WORK** in your dye house by using

SMITH, DRUM & CO. MACHINES

Full Particulars on Application

CORAL AND CUMBERLAND STREETS

PHILA., PA.

Southern Agent, H. G. MAYER, Realty Bldg., Charlotte, N. C.

LAWSONS

Hope Foundry, LEEDS, England

BRANCH OF

Fairbairn Lawson Combe Barbour, Ltd.

MAKERS OF MACHINERY FOR

Preparing and Spinning

Flax, Hemp, Tow and Jute

Special Machinery for the Manufacture of Twines, Rope Yarns and Binder Twine

Good's Combined Hackling and Spreading Machine.

Long Reach Screw-Gill Drawing Frames. Chain-Gill Drawing Frames with Apron Heads.

Patent High-Speed Horizontal and Automatic Spinning Frames for Manila.

Improved Laying Machines.

Haskell-Dawes Tubing Twisters.

Brownell's Patent Twisting and Laying Machines for Twine.

N. B.—Complete Plans and Estimates for Flax, Tow, Hemp and Jute Mills, Trawl Twine Factories and Steam Ropeworks.

No Other Ready Roofing Can Withstand This Test!

The flame of a powerful blow-torch was placed within two inches of J-M Asbestos Roofing. At the end of fifty minutes the roofing was not burned or injured, being only slightly blackened by smoke. This is one of a number of tests which prove conclusively that the only permanently durable prepared roofing—the one that better than any other resists fire, acid, rot, rust, heat, cold and wear is

J-M Asbestos Roofing

Other ready roofings are made of wool felt, rag stock, paper, shoddy, coal tar, and other highly inflammable materials, which are an actual menace to a building instead of a protection. J-M Asbestos Roofing is the "cheapest per-year" roofing because it requires no coating or painting to preserve it. The first cost is the only expense.

Fire-proof construction is better fire protection to a building than any amount of fire insurance. By covering buildings with J-M Asbestos Roofing it will protect them from fire at no extra cost.

Write our nearest branch today for samples and Catalog—or simply write your name and address on margin of this advertisement and mail it to us.

H.W. JOHNS-MANVILLE CO.

Manufacturers of Asbestos and Magnesia Products

ASBESTOS

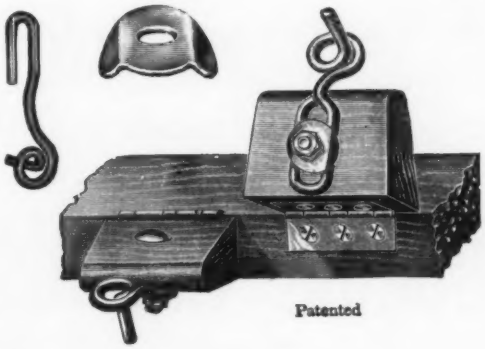
Asbestos Roofings, Packings, Electrical Supplies, Etc.

Baltimore, Boston, Buffalo, Chicago, Cleveland, Dallas, Detroit, Kansas City, London, Los Angeles, Milwaukee, Minneapolis, New Orleans, New York, Philadelphia, Pittsburg, San Francisco, Seattle, St. Louis

1229

For Canada—The Canadian H. W. Johns-Manville Co., Limited
Toronto, Ont. Montreal, Que. Winnipeg, Man. Vancouver, B. C.

The accompanying illustration shows the **Palmer** adjustable thread guide for spinning and twisting. This guide is **Adjustable** in all directions and can be rigidly and permanently fixed. **Thread** boards and rails of metal which are expensive are not necessary with this **Guide**



Patented

SEND two clappers for free samples for circular.

The Palmer Revolving Guide for Wet and Dry Twisting

Patented

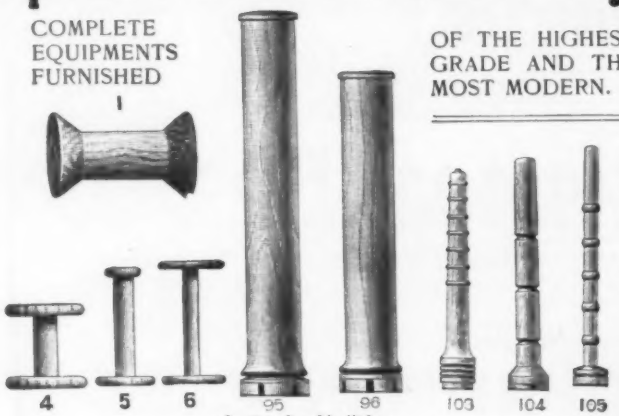
Lays the fiber closer
Makes a smoother twist
Saves power
Will outwear many wire guides

THE I. E. PALMER CO., Middletown, Conn.

Spool and Bobbin Machinery

COMPLETE EQUIPMENTS FURNISHED

OF THE HIGHEST GRADE AND THE MOST MODERN.



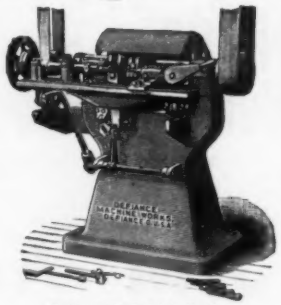
Invented and built by

THE DEFIANCE MACHINE WORKS,

DEFIANCE, OHIO

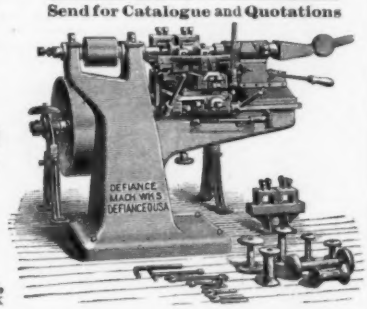
Also, Automatic Machinery for Making

AUTOMOBILE SPOKES, RIMS, WHEELS and BODIES, CARRIAGE and WAGON HUBS, SPOKES, RIMS and WHEELS, WAGONS, CARRIAGES, SHAFTS, POLES, NECK YOKES, SINGLE TREES, HOOPS, HANDLES, INSULATOR PINS, TABLE LEGS, SHOE LASTS, BALUSTERS, OVAL WOOD DISHES and for GENERAL WOODWORK.



Automatic Bobbin Lathe.

Send for Catalogue and Quotations



Automatic Spool Turning Lathe.

Cloth Washers, Dye Tubs, Vats, Fulling Mills,
Piece Dyeing Machines, Special Machinery,
Brass Founders, Tanks, To Order.

Hopkins Machine Works, Inc.

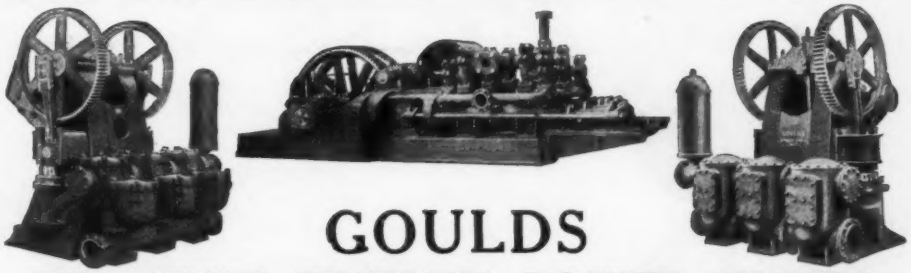
BRIDGETON, R. I.

Providence Office, 49 Westminster St.

Spindles and Flyers, for Cotton, Wool, Silk, Flax, etc.

Send for our latest Catalogue and Price List

Dye Tub Valves, Cloth Guides, etc. Bronze or Porcelain Rings.



GOULDS
EFFICIENT TRIPLEX POWER PUMPS

A particularly reliable pump is required for the modern factory, mill or power station. The operator should be able to devote his attention to other things than tinkering with pumps. Goulds pumps are reliable. They will pump day in and day out, the only attention necessary being a little oiling now and then.

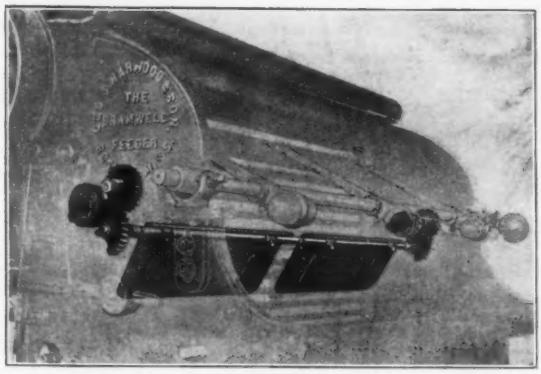
The economy of power driven pumps is self-evident. The same power which drives the mill may be utilized, thus taking advantage of the higher efficiency of larger prime movers. Send for catalog giving details of all Goulds pumps for every service.

The GOULDS MANUFACTURING COMPANY
62 W. FALL ST., SENECA FALLS, N. Y.

NEW YORK. BOSTON. PHILADELPHIA. PITTSBURG. CHICAGO. ST. LOUIS. DENVER. SEATTLE. PORTLAND SPOKANE. LOS ANGELES. SAN FRANCISCO. JACKSONVILLE. CHARLOTTE. NEW ORLEANS. MONTREAL. TORONTO

THE GEB COMPENSATOR
For Bramwell First Breaker Card Feeds

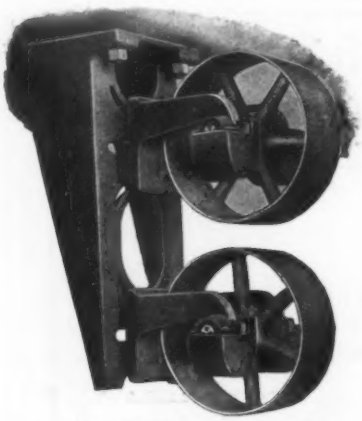
Secures Even Feeding



Prevents Sorting of Stock

We are the Feeder Specialists

GEO. S. HARWOOD & SON, 53 State St., Boston, Mass.



Adjustable Binder Frame for belt drives to Spinning Frames, Twisters, etc.

WM. SELLERS & CO., Incorporated

Philadelphia, Pa.

Makers of

Shafts,
Couplings,
Pulleys,
Hangers,

and all most approved appliances for the

Transmission of Power by Belts, Gears or Ropes

Catalogue upon request.

Machine Tools,
Injectors, Power Cranes.

PATENTED

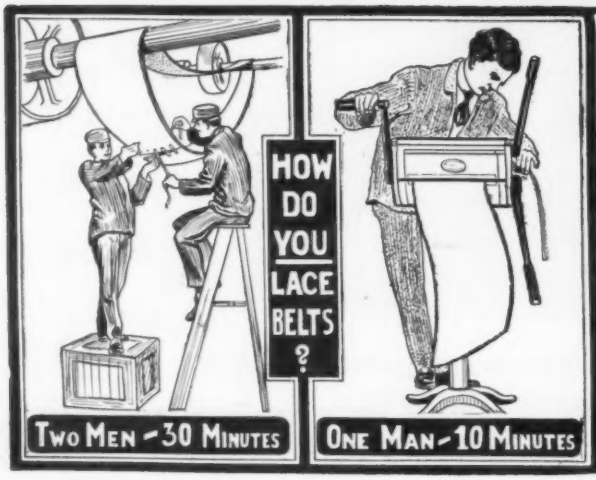
THE AMERICAN STEEL SPLIT PULLEY AND SIX MONEY-SAVING POINTS

1. It is 45% lighter than a cast iron pulley of the same size.
2. It is easier to put up on the shaft.
3. It causes less friction on the hangers.
4. It "fans" less air than wood or iron pulleys.
5. Being throughout of steel, it is practically indestructible.
6. It will neither warp, burn, shrink nor swell.

THE AMERICAN PULLEY CO.

MAIN OFFICE & WORKS PHILADELPHIA, U.S.A.

Chicago Branch, 124 S. Clinton St.



The Jackson Belt Lacer operated by one man laces a 20 inch belt in ten minutes, other widths in proportion. How long does it take in your shop? ¶ The Jackson Joint consists of intermeshing steel wire lacing, connected or disconnected in a second, by inserting or withdrawing a raw hide pin. ¶ It saves time and expense, not only because a splice can be made quickly, but because the connection is so neat and durable that the belt is not apt to break again at the same place and its life is thereby greatly lengthened. A Lacing made by the Jackson Belt Lacer is **equal to an endless belt.** ¶ Write for booklet.

BIRDSBORO STEEL FOUNDRY AND MACHINE COMPANY,

Birdsboro, Pennsylvania

CRESSON

POWER TRANSMITTING MACHINERY

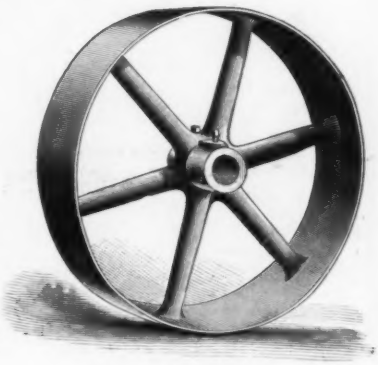
RING OILING HANGER
"PHILADELPHIA PATTERN"

Shafting Pulleys
Couplings Fly Wheels
Hangers Gears

Rope Driving a Specialty

Power Plants Designed and Equipped

Prices Right Shipments Prompt
Catalogs for the asking

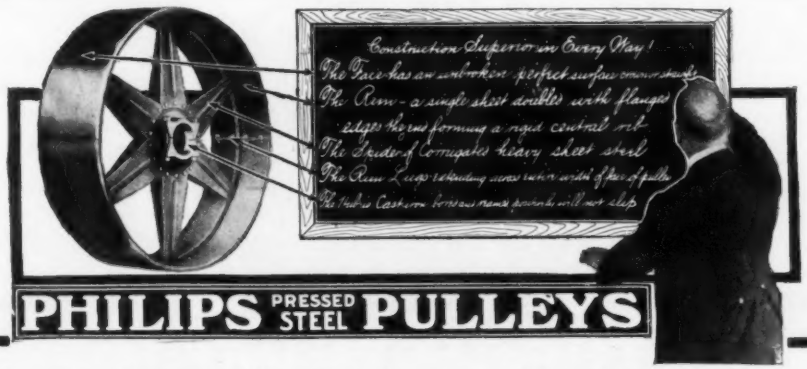


CAST IRON
SOLID PULLEY

GEO. V. CRESSON CO.

ENGINEERS FOUNDERS MACHINISTS

PHILADELPHIA, PA., Allegheny Ave., West of 17th Street NEW YORK CITY, 90 West Street



PHILIPS PRESSED STEEL PULLEYS

Each month for a long time we told you all about some one point of superiority of the Philips.

Now we want to put all these points right before you so you can more fully realize how perfect the Philips is from hub to crown.

Look at the blackboard and read the facts.

They tell you the Philips story.

But here's another feature that's not there.

Notice the bridge construction of the arms. See how wide apart they're spread to grip the cast iron hub. Now that's why a transverse strain cannot affect the Philips. And it's where the other pulley falls down.

These are the reasons we know the Philips is as perfect as modern construction can make it and we want the opportunity to prove it to you.

We can do it—we're doing it every day. Our business has tripled in the last two years. Isn't that enough evidence that we're proving the perfection of the Phllips to a good many others.

Send us your name and address to-day before you forget so you'll get the **facts** by return mail.

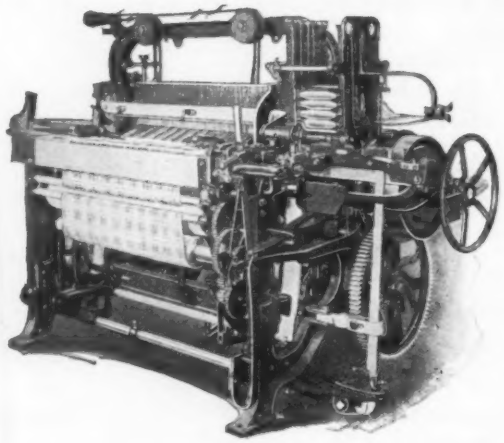
Send it right **now.**

PHILIPS PRESSED STEEL PULLEY WORKS

337 GLENWOOD AVENUE

PHILADELPHIA, PA.

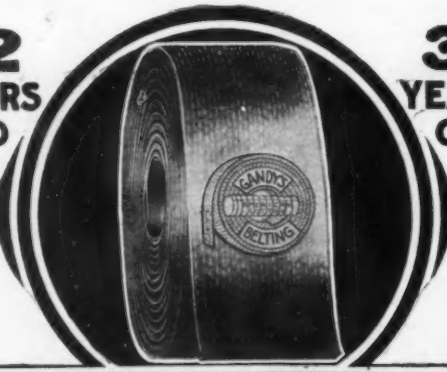
Crompton & Knowles Automatic Loom



Weave perfect goods and reduce weave room expense.

Crompton & Knowles Loom Works Worcester, Providence Philadelphia

32 YEARS OLD **32 YEARS OLD**



THE GANDY BELT

In the last two ads. we talked about the **cost** of the Gandy Belt. First, we told you it was only

1-3 The Cost of leather and—Second 25% cheaper than rubber.

Now we tell you it has been on the market for thirty-two years.

Don't you think that is the best kind of a guarantee? Isn't it proof that although we sell the Gandy Belt much cheaper than either leather or rubber,—It does "MAKE GOOD"

The Gandy Belt is acknowledged to be the most durable and economical belt for Driving, Elevating and Conveying. Unaffected by heat, steam, water, dust, or atmospheric changes.

We want to prove these things to you.

Let us send you testimonial letters that tell of Gandy successes in your particular line of work. They're remarkably convincing evidence. The use of "The Gandy" means a saving of money to **you.**

Write for our free booklet, "Experiences with The Gandy Belt." But write **now,** before you forget.

THE GANDY BELTING CO., 747 W. PRATT ST., BALTIMORE, MD.
New York Office, 88-90 Reade Street.

SALEM ELEVATOR WORKS

SALEM, MASS.

ELEVATORS

ESPECIALLY ADAPTED FOR MILL USE.

SEND FOR ILLUSTRATED CATALOGUE AND ESTIMATE.

Selas Lamp for Mills

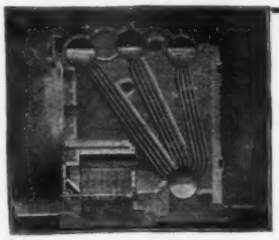
MORE LIGHT

LESS COST

SELAS is the best artificial light for matching colors.
SELAS is 70% cheaper than ordinary gas light.
SELAS gives the best light distribution.
SELAS can be installed without interruption of service.

SELAS COMPANY

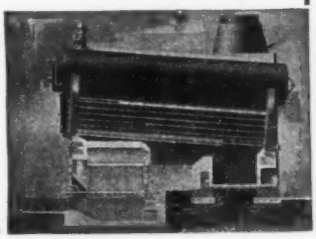
90 West Street **NEW YORK**



The Murphy Automatic Smokeless Furnace

Burns Slack with Great Economy

The Murphy can be installed under any type of fire-tube or water-tube boiler and to units of any size.



SETTING UNDER TWO TYPES OF BOILERS SHOWN HEREWITH

MURPHY IRON WORKS

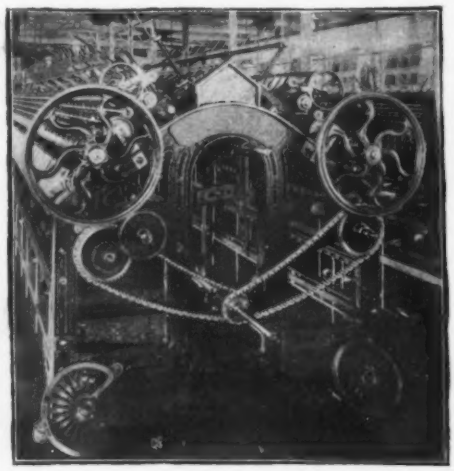
DETROIT, MICH.

Improve Your Product

BY USING

Morse Flexible Gearing

This form of transmission is **Durable, Silent, Highly Efficient,** provides a **Positive** speed ratio and runs with a **Minimum** amount of care and attention.



The **MORSE SILENT CHAINS** as shown above have proved our claim that they are the most **Durable** and most **Economical** Form of Transmission that can be installed to run on a **Positive Speed Ratio** from cylinder shaft to twist gears.

Improvement in the yarn and **Reduced** upkeep cost has always followed the installation of these drives.

In one large mill alone we have equipped over 350 frames.

We now have in successful operation drives transmitting an aggregate of over 400,000 H. P. Individual drives running from 1 H. P. to 2000 H. P. each.

Let us figure on some of your power transmission problems.

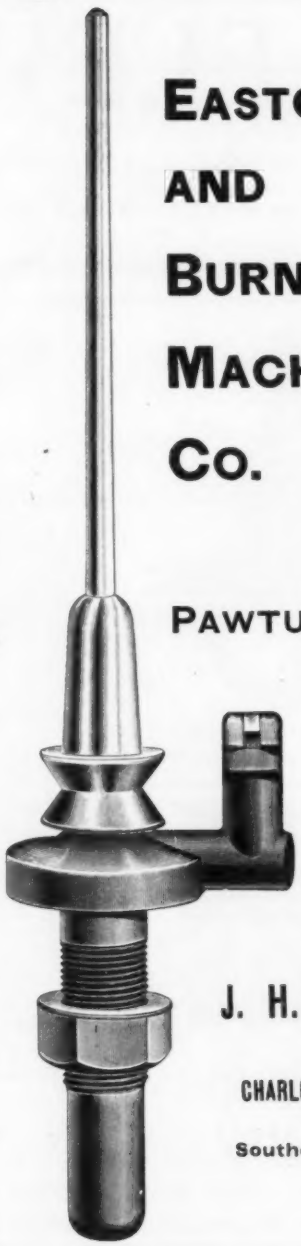
Our Bulletin No. 9B is particularly interesting.

MORSE CHAIN CO.

ITHACA, N. Y.

N. E. Branch, 141 Milk St., Boston

SPINDLES



EASTON AND BURNHAM MACHINE CO.

PAWTUCKET, R. I.

J. H. MAYES,

CHARLOTTE, N. C.

Southern Agent.

DEAN BROS. STEAM PUMP WORKS

INDIANAPOLIS, IND.

DUPLEX PUMPS, SIMPLE PUMPS
ATLANTIC BOILER FEEDERS
JET AND SURFACE **CONDENSERS** ELECTRIC PUMPS BELTED PUMPS, Etc.

VERTICAL AIR PUMP AND JET CONDENSER

DUPLEX DURABLE PUMP

SIMPLE PUMP

TWIN AIR PUMP AND CONDENSER

DE LA VERGNE
Crude and Fuel Oil Engines

BUILT IN SIZES UP TO 250 H. P.

ECONOMICAL and RELIABLE

THAT IS WHY THESE ENGINES HAVE BEEN REPLACING STEAM AND ELECTRIC POWER FOR THE PAST
14 YEARS

OVER 14,000 IN USE

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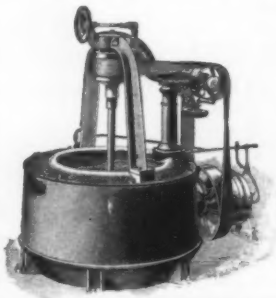

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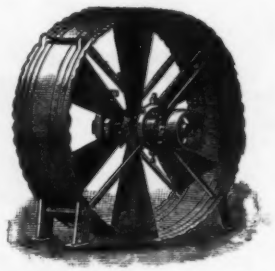

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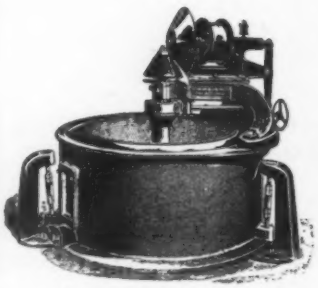

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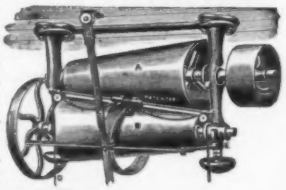

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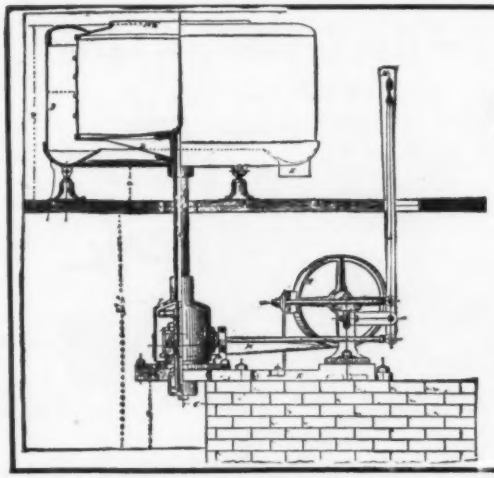

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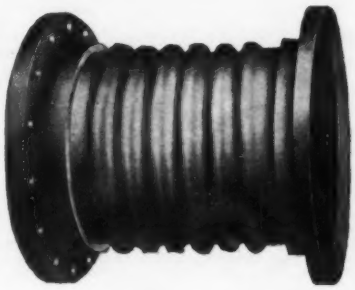

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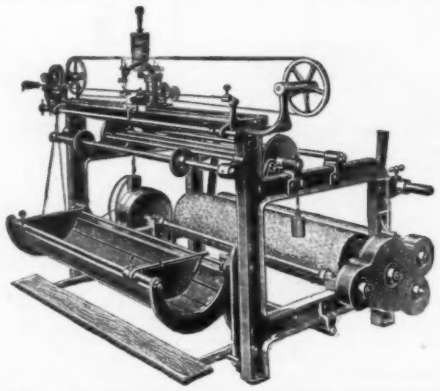

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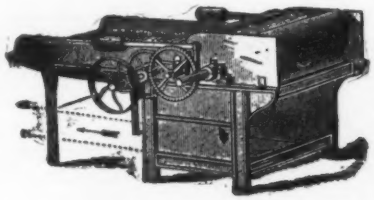

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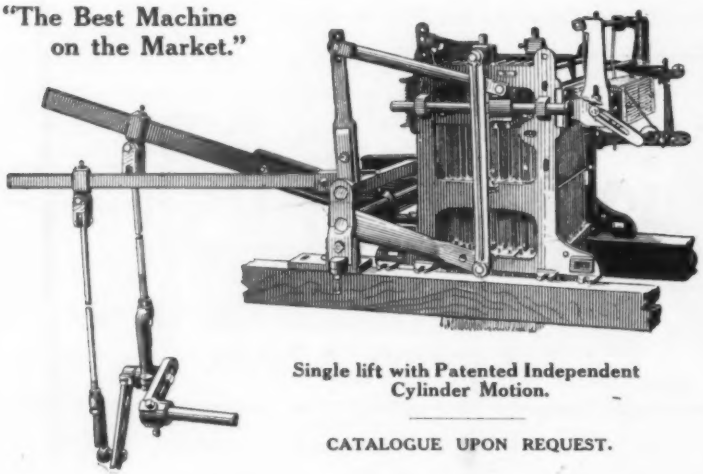

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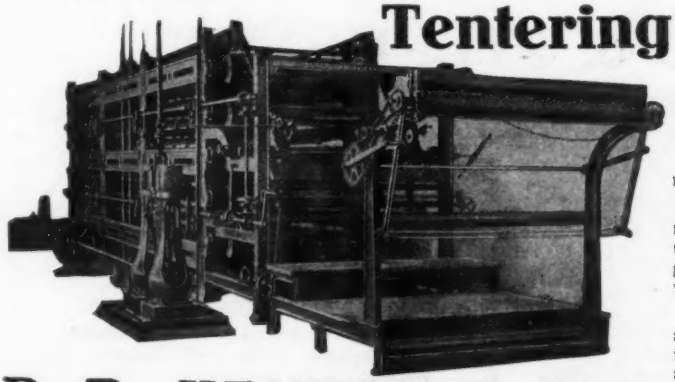

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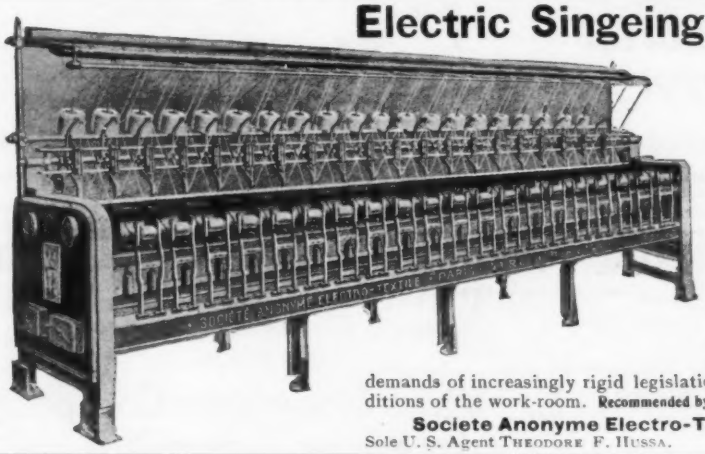

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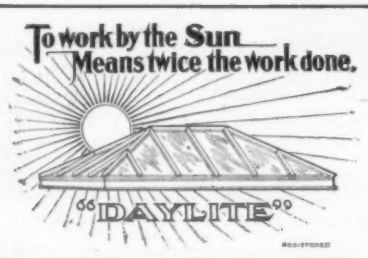

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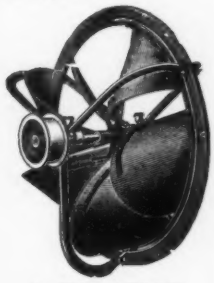

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Correspondence.

We solicit correspondence on textile subjects. Articles accepted will be paid for. Name and address must always be given, not necessarily for publication. Subscribers are invited to make free use of our Questions and Answers Department; correspondence is strictly confidential.

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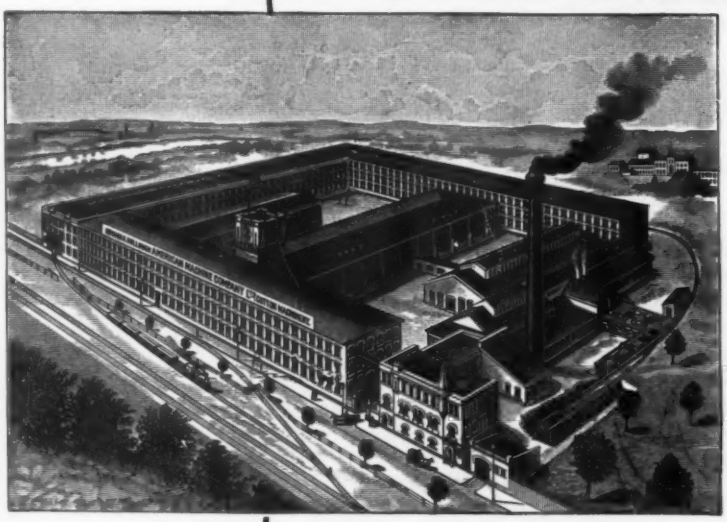

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VOL. 40 (NEW SERIES.) October, 1910 No. 1

Monthly Comment.

Industrial Insurance and Old Age Pensions.

In this issue will be found a statement of the system proposed by Cheney Brothers, South Manchester, Conn., for industrial insurance and old age pensions for their employes, and which indicates clearly the care with which the plans have been formulated before having been adopted. One feature that impresses us as deserving of especial approbation is the recognition of the fact that such industrial insurance and old age pensions find their justification in the common interests of employer and employe and consumer. The employer and employe are not the only parties in interest. The public has its duties and responsibilities, which are clearly recognized when the government formulates and carries out the plans, as is done so systematically in Germany, and more recently in Great Britain. This fundamental principle of the common interest of employe, employer and consumer is accepted by Cheney Bros., in these words:

> "In a wider sense it (the purpose) is a definite statement by the company of the general principle under which they have acted for many years, that injuries, so far as they are a necessary incident to industry, are a part of the cost of production and should be borne to that extent by the consumer, and not entirely by the injured person."

It is particularly gratifying that a company having so extensive a business, such ample resources and a standing so high and well deserved as have Cheney Brothers, should adopt a system of industrial insurance and old age pensions founded on that far reaching principle. The event is of deep significance not only to the employes of Cheney Brothers, but to every wage-earner in the United States, and we hope that our expectations of the complete success of Cheney Brothers' plans will be realized.

The New Sales Note for Cotton Piece Goods.

The deliberations which have been in progress for several years past by the joint committee of manufacturers, commission merchants and converters, representing the National Association of Cotton Manufacturers and the American Cotton Manufacturers' Association, have at last resulted in the production of a sales note which in the opinion of the committee meets all the reasonable objections that have been raised against previous reports. The form will be found in the reports of the committee to the convention at Portsmouth, on another page.

Up to this time it has been difficult to arouse much enthusiasm on the part of the buyers about it. The principal objection on the part of buyers has been the failure to provide adequate redress from their point of view in the event of non-delivery of goods at the time agreed upon. In rising markets

this has been a source of serious loss to buyers.

The amended form of sales note provides that non-delivery on the promised date of one or more installments of a contract is not sufficient ground for cancellation of the whole contract, unless it constitutes a breach of the major portion of the contract but (and here is the important point), the buyer has the right to go into the open market and purchase similar goods which he has failed to receive from the mill within the agreed time, and apply the purchase to the contract, the difference in price, if any, to be paid by the seller.

The provisions now seem fair to both sides and there is no reason why this sales note should not be generally adopted, as it ought to be, in order to provide a definite basis of understanding, not only for sales direct, but through commission houses and brokers.

If this should be the result, as no doubt it will in time, the committee may feel amply repaid in having performed one of the most important pieces of work yet undertaken by the association. Its success will make it all the more easy for the association to take up and settle other trade problems.

The Lockout in Lancashire.

As a result of a dispute in the Fern Mill, Shaw, as to whether picking the motes from the card flats with an awl should form part of the card grinders' regular duties, about 140,000 cotton mill operatives are idle through a lockout that was declared by the employers on Oct. 1. The dispute hinges on the interpretation of the Brooklands Agreement under which the employers and operatives in Lancashire have been working for seventeen years. The employers offered to refer the question of interpretating to Controller of Labor Askwith or to the solicitors who drafted the Agreement for the employers and employes in 1893, but this offer was rejected by the operatives, who demanded that the lockout at the Fern Mill be called off, the discharged grinder reinstated, and the grinders be not required to pick the flats.

We shall not attempt at the distance to express an opinion as to the merits of the dispute. One thing, however, seems reasonably certain, namely, that an agreement under which such an industrial calamity can result from such a petty dispute is in need of amendment. The stoppage comes at a time when the employers find the business of cotton manufacturing unprofitable because of high priced cotton and low priced goods, and the lockout may bring about the curtailment of production that the employers have failed to accomplish by mutual agreement to run on short time.

It seems as if the conditions were particularly unfavorable for the operatives to engage in such a struggle at this time. Many of them have been working on short time for a year or more. Winter is at hand and their meagre savings are depleted. At the same time their idleness will have a tendency to depress the price of cotton and raise the price of cotton goods, two results which the employers will welcome.

The Middle States Textile Manufacturers' Association.

Last July a well attended meeting of textile manufacturers from the Middle States was held at Evansville, Ind., to discuss the advance in freight rates. The interchange of views on this question was so profitable that the conviction was forced on the minds of all present that a permanent organization should be formed in order that the Middle States textile manufacturers might have ready at all times an effective means of handling matters affecting their common interests. With characteristic Western enterprise the Middle States Textile Manufacturers' Association was organized then and there with the following officers: president, Paul J. Marrs, of the Henderson (Ky.) Cotton Mills; vice-president, Phillip S. Tuley, of the Louisville (Ky.) Cotton Mills; secretary, Lee Rodman, of the Indiana Cotton Mills, Cannelton, Ind. The following committee on organization to report at the September meeting was appointed: C. N. Brown, treasurer, Evansville (Ind.) Cotton Mills; Phillip S. Tuley, of Louisville, Ky., and Lee Rodman, of Cannelton, Ind.

At the meeting held in Louisville, Ky., on Sept. 21, the following board of governors was elected: Paul J. Marrs, of Henderson, Ky.; Phillip S. Tuley, of Louisville, Ky.; Lee Rodman, of Cannelton, Ind.; Robert A. Cochran, secretary, January & Wood Co., Maysville, Ky.; E. S. Hobbs, treasurer, Aurora Cotton Mills, Aurora, Ill.; J. B. Morgan, treasurer, Wariota Cotton Mills, Nashville, Tenn.; C. A. Young, of Brower & Love Bros., Indianapolis, Ind.

Membership in the Association is to be open to manufacturers in all branches of the textile industry. The annual meeting will be held in July, but it is the intention to hold several meetings during the year.

The Continental Chaos.

Last month we published a very interesting review of the situation in the German cotton industry by Heinrich Semlinger, manager of the Mech. Baumwoll-Spinnerei und Weberei, at Bamberg, Bavaria, and which originally appeared in the "Wochenberichte der Leipziger Monatschrift fuer Textile-Industrie." The expression used in one of the tables, "19/18 faedige Kattune" puzzled us, not because of the language, but because of the figures, "19/18." Did it mean 19/18 threads in a centimeter or in one of the many other units of measure used in the German textile industry? We have been assured so often by our friends, the metricites, that the metric system has been universally used in Germany since 1871, that in an unguarded moment we accepted it as a reality in this case. We should of course have known better than to do this, but we did it. As a result the equivalent per inch was stated as 48/46 threads, assuming that the German basis was the centimeter. A doubt, born of past experience, led us, however, to write to Herr Semlinger for definite information on this point, and his reply, which follows, shows that the German basis for the sett of cotton print cloths is the old French inch (1.07 English inches) and not the metric centimeter:

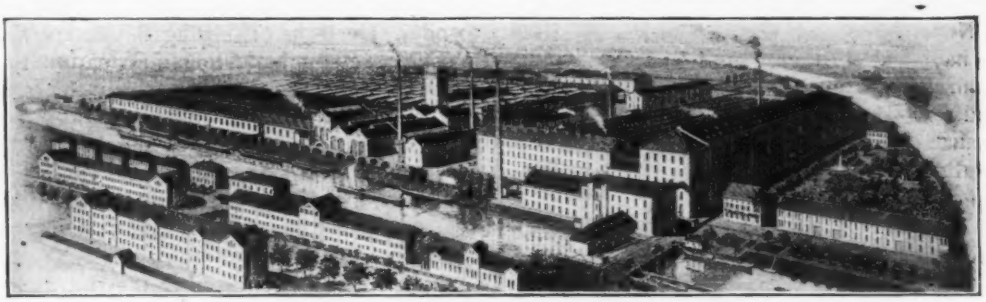
Bamberg, Sept. 10, 1910.

Editor Textile World Record:

Dear Sir:—Replying to yours of Aug. 29, I am pleased to learn that you are to publish my article on the situation in the German textile industry in your esteemed journal. Referring to your question, the expression "19/18 thread, Kattune, 92 cm (36 inches) wide" refers to cloth having 19 threads of warp and 18 threads of filling per 1/4 French inch (.675 cm) and made of 36s/42s yarn (English number). The cloth 88 cm (34½ inches) wide 16/16 thread is made of 20s yarn, American cotton, with 16 threads of warp and 16 threads of filling (per 1/4 French inch); all in unfinished condition, as the cloth comes from the loom. Bleached or printed goods are not officially quoted in the German textile markets.

Respectfully,

H. Semlinger.



THE MECH. BAUMWOLL-SPINNEREI UND WEBEREI, BAMBERG, GERMANY. DIVIDENDS: 25% IN 1908; 17½% IN 1909; CAPITAL 3,600,000 MARKS.

Accordingly the sett of the cloth is 71/67 per inch, instead of 48/46 per inch as given in our September issue. That is, there are 71 threads of warp and 67 threads of filling per inch.

This case presents a noteworthy example of the Continental chaos of weights and

measures that has followed the forcible introduction of the metric system. Here is the manager of one of the largest cotton mills in Germany writing on the state of the cotton trade in 1910 and giving an elaborate table of official quotations for German print cloth, with the sett based on the French inch and without naming the basis of measurement. There is no more conclusive evidence that a unit of measure or weight is a thoroughly established standard than the habit of omitting to name the unit when using it as a basis for quotations or other expressions. Everyone understands that "15 cent cotton" means 15 cents per pound, although the word "pound" is not used, because the pound is the established standard by which cotton is sold. Likewise the sett of print cloth in Germany, as we have just learned, is so generally, habitually and exclusively based on the French inch that the Germans find it unnecessary to name the inch when giving the sett. Moreover the sizes of the yarn were given by Herr Semlinger in English counts without naming the system of numbering.

Nevertheless we would not be surprised to have some one come along and solemnly assure us that he knows German weights and measures are all metric because he just returned from Germany or was in Germany in 1871 when the change was made without difficulty.

A Difficulty with the Woolen and Worsted Business.

There was recently brought to our attention a dispute between a woolen manufacturer and a clothier which illustrates in so striking a manner one of the most serious difficulties in the wool manufacturing business that we persuaded the manufacturer to show us the entire correspondence and give us all the particulars in order that we might publish the facts in the interest of a sorely needed reform.

A month or so ago a Western manufacturer of men's clothing received a curt note from one of his Eastern customers, who stated he was sending to the clothing manufacturer an overcoat for which he had been obliged to give a new coat to the consumer. "There will be no need to explain why," said the retailer, "when you see the color, which has entirely faded out." On the day the letter and coat was received the Western manufacturer sent both to the commission agent from whom he had bought the cloth, and in a letter equally as curt as that from the retailer, said it was not necessary to go into any long explanation, as the color of the cloth, which was a light drab, had certainly gone to pieces, adding that he thought the retailer was justified in his stand. The commission agent sent the coat and the two letters to the manufacturer, who refused point blank to be responsible for any loss the clothiers might sustain by reason of having given the consumer a new coat for the old one. The manufacturer informs us that the color has faded, but that the coat looked as if it had been worn at least through one season, probably longer. It was sold at retail for $15.

Now which side was right, the clothier who asked the manufacturer to pay for a new coat, or the manufacturer who refused to pay? Desirous of settling this interesting question we sought further information, and found that the cloth from which the coat was made weighed 14 ounces, was woven with 34 picks, had been sold to the Western manufacturer for 90 cents a yard, subject to discounts, and netted the cloth manufacturer approximately 72 cents a yard, and that 2 1/2 yards of cloth, netting the manufacturer $1.80, had been used in the suit.

Regardless of the material used, the cost of manufacturing such a cloth, with every economy practised, would be not less than 34 cents a yard. As the fabric weighed 14 ounces, at least 19 ounces of clean stock would be required for each yard. Allowing nothing for profit the problem before the manufacturer was to buy 19 ounces of clean stock for 38 cents, the difference between the net price of the cloth and the cost of manufacturing. In other words, clean wool stock must be bought for 32 cents a pound if the manufacturer was to avoid a loss and merely get a new dollar for an old one. At the time that problem was presented to the

manufacturer clean wool of the quality required for this cloth was selling for 68 cents a pound. The only way in which a pound of clean wool stock of this quality could be obtained was by using a mixture of wool waste and shoddy with enough wool to make it possible to spin the stock into yarn that could be woven into cloth.

To select these materials, determine the proportion of each and adapt the fabric structure to the mixture called for long experience and manufacturing ability of the highest order. The color was to be a light drab, inherently fugitive. This color was made as fast as possible without using indigo for bottoming, which on such low stock would have been a manufacturing absurdity.

The cloth manufacturer had been forced to these manufacturing extremities by the insistent demand of the clothing trade for low priced cloths. The result was a "commercially all wool" 14 ounce cloth for 72 cents, whose manufacture involved the extreme conditions we have described. The manufacturing clothier who buys an "all wool" fabric at that price is no more justified in expecting it to stand the test of high priced pure wool fabrics than the buyer of gold filled jewelry would be to expect his purchase to stand the acid test for pure gold. And if the manufacturing clothier sells a garment made of such goods with the expressed or implied guarantee that should go only with high priced goods, he should bear the resulting loss alone. On the other hand, if he wants his garments to stand the rigorous tests prescribed in this case, he must expect to pay a higher price for the cloth.

In the case under consideration doubling the cost of the cloth would have been equal to adding only $1.80 to the cost of a $15 coat. We do not intend to discuss now the cost of manufacturing and distribution, nor the successive profits of the manufacturing and retail clothiers, all of which result in $1.80 worth of cloth at the mill being offered to the ultimate consumer in the form of a coat for $15. Neither do we desire now to dwell upon the fact that the difference in cost between an all wool cloth and a fabric made of a mixture of waste, shoddy and a little wool amounts to but a trifling sum on a suit of clothes, nor on the equally apparent fact that a scarcity of wool suited for a particular grade of goods forces the cloth manufacturer to make inferior fabrics from wool substitutes, nor on the converse of that proposition, that the manufacturer, if relieved of such scarcity, could make better cloth and thus greatly enhance the intrinsic value with but a trifling increase in the cost of the garment ready for the wearer.

All these facts are important and deserving of careful consideration, but what we desire to emphasize is the unreasonable demands now made by the clothing trade on the manufacturers of wool goods, demands made not because the clothiers are unreasonable men, but because they do not understand the technical and commercial conditions prevailing in the manufacture of wool goods. They are unequaled in the manufacture of cloth into clothing, a business that they have developed on original lines until this country leads all others in the production of ready-made garments for men's wear. They combine with this skill in manufacture a natural aptitude for trade. In attaining this preeminence in tailoring and business the manufacturers of ready-made clothing necessarily become specialists of a high order, with the limitations of specialists. They do not understand the requirements of the extensive and complex industry of producing the cloth they covert into clothing. Thus they are easily led into making such extreme and unreasonable claims as the one to which we have called attention. The difficulty can be successfully met in two ways: by the wool manufacturers uniting in an uncompromising refusal to sanction such claims; or by inducing the clothiers to study the mechanical, chemical and commercial conditions prevailing in the manufacture of wool goods.

There was invoiced in the United States in 1909 Persian rugs and carpets valued at $349,129 from Smyrna, $3,137,015 from Constantinople, and $143,392 from Bagdad.

Retrospect and Prospect.

The tariff schedules, and particularly the wool schedule are prominent in the public mind, the leading subject for comment in the press. Technical statements of facts are so frequently quoted from the Textile World Record by non-technical writers, for whose deductions or point of view we are in no way responsible, that it may not be out of place to give a review of our own published tariff position for the benefit of those who may have forgotten or to whom our position has been misrepresented.

When President Taft and a Republican Congress were elected in 1908 pledged to the revision of the Dingley tariff we accepted the result in good faith as indicating that the tariff would be revised as nearly as possible in accordance with the party platform and Mr. Taft's public pledges. It was, as we believed, to be an honest and thorough revision of a protective tariff by the friends of protection. On the day following the election of that year we wrote these words, which will be found in our November, 1908, issue:

> Congress and the President . . . can now return to the fundamental principles of protection and by a wise, careful, conservative and public investigation and revision of the Dingley tariff, provide the American people with a secure foundation for enduring prosperity.

The question of protection was not at stake. The only issue was the revision of the protective tariff. It was our belief that we could render a real service to the textile trade by publishing information and facts of which we had technical knowledge bearing on the schedules and in which this journal as a representative of this industry was naturally interested. If there were facts tending to show defects in the textile schedules, they should be made known for the guidance of those whose duty it was to frame the new tariff.

At the tariff hearings in December there was a clash between the carded woolen manufacturers and worsted spinners, which rapidly developed into open warfare. The difference between these factions was over the tariff on wool and by-products, the carded woolen manufacturers demanding an ad valorem tariff in place of the specific duties. Without the slightest partiality to either side we pointed out in January, 1909, the defects of a specific duty on grease wool varying widely in shrinkage and intrinsic value; we illustrated the compensatory duty by applying it to eleven fabrics, basing our calculations, not on information and belief, but upon knowledge, closing with this appeal to all parties to get together on the basis of a square deal:

> The new tariff should afford adequate protection to all branches of the industry. That is the basic principle on which the revision must be made. . . . When inequalities in a tariff are corrected some one must give up an unfair advantage in justice to others. The wool grower, the worsted spinner, the woolen manufacturer and Congress representing all interests including the consumer, should get together with the determination to incorporate in the tariff bill of 1909 the square deal of which we have heard so much for seven years. The wool grower may find that he needs protection against evils at home more than against imports from abroad; the worsted spinner may realize that his higher interests require a yielding up on some of the advantages he now possesses; while the carded woolen manufacturer would doubtless gladly exchange such tariff protection as he does not need for a supply of the raw material without which he cannot live. And this general equalization of rates, while affording adequate protection to American industry, will satisfy the consumer, who is the final arbiter in this country.
>
> A majority of the people in the United States believe in adequate protection and want it incorporated in the new bill. They also want excessive protection abolished. Under these conditions the course for the textile industry to adopt is plain. It is to aid Congress to determine what is adequate protection and to insist that the rates on all goods shall be lowered or raised as may be necessary to bring them to the "adequate" mark.

In February the contest over the tariff was approaching its height, and to supply conclusive evidence regarding the compensatory duty on wool goods as based on the shrinkage in manufacturing, we published the statement of a test of shrinkage in manufacturing, covering the entire production of the Hecla Mills, Uxbridge, Mass., for nearly four years, and made personally by the editor of this magazine, who had treasured the data for twenty years, waiting for an opportunity to use it that would be worthy of the patience and industry with which it had been made. This we believe is the most extensive

test ever made to determine the shrinkage in manufacturing wool goods. In the same issue we published this reply to a suggestion for free wool:

"But why not consider the simple and effective plan of repealing all duties upon raw wool?"—The Journal of Commerce.

Because both the wool grower and wool goods manufacturer are American producers, and as such one has the same fundamental right to protection for himself and the general welfare as has the other. The man who wants everything free that goes into his mill and everything protected that comes out of it deserves no consideration and will probably receive none.

The following month, March, 1909, we had occasion to point to the discrimination against the growers of light shrinking wool, and we appealed for an equalization of rates that protection might be made fair, using these words:

If a prohibitory duty on raw wool and mohair is the thing, then say so, and put up the duty on mohair to the prohibitory point. But if the object of the new tariff law is to afford reasonable and adequate protection to all American producers, then let some means be devised by which the tariff on light shrinking wools and mohair will be raised, and that on heavy shrinking wools lowered so as to bring both to a fair and adequately protective level.

By the time another month, April, 1909, had rolled around the Payne bill had been reported to the House. Our first reading of schedule K disclosed to us that in revising the tariff on tops the Ways and Means Committee had clumsily framed classifications and rates that would have destroyed the manufacture of fine tops in this country by discrimination in favor of the foreign top maker. In the same way that we had already appealed for fair play for the carded woolen manufacturer and the grower of light shrinking wool, we now protested against injustice being done to the worsted top manufacturer, that way being to state what we knew to be the facts. We were the first to call attention publicly to this defect, giving a statement of the proposed duty applied to four grades of tops ranging from coarse to fine, and commenting as follows:

From this it is clear that on the coarse tops from light shrinking wools the American top maker is protected by a high and prohibitory duty, while the duty on tops made from very fine and heavy shrinking wool is less than the duty on the wool itself. . . .

While the necessity of remodeling this top paragraph to save the manufacture of fine tops from extinction is beyond question, it is no plainer than the necessity of relieving the manufacturer of carded woolen goods from the burden of a specific duty on heavy shrinking clothing wools which has done so much to bring that industry to the verge of extinction. It is inconceivable that Congress will be so blind to these technical conditions or so unfair as to refuse a revision of the Payne top paragraph; or while revising the top paragraph for the benefit of the top makers to refuse to grant the same relief to the makers of carded woolen goods. . . .

The evil that the Payne bill threatens the top maker with and the evil that for years has oppressed the carded woolen manufacturer are the result of the same cause, a specific duty on grease wool of widely varying shrinkages. It would be an intolerable discrimination for Congress to withdraw this threat to the worsted top maker and leave the carded woolen manufacturer to suffer from the evil itself.

Before our next issue, May, 1909, appeared, the Payne bill had passed the House and been sent to the Senate. Then on the eve of the Senate debate we offered this suggestion:

There can be no question that the general tone of the press and public opinion is hostile to the Aldrich finance committee bill. The public expects, or thinks it has been led to expect, a real revision of the tariff. In the textile schedules there is need of important changes in some sections which would be of benefit to the majority of manufacturers and improve the standing of all of them in the eyes of the public. To defy public sentiment and refuse any reasonable concessions would seem to be an unwise use of political influence. A failure to recognize the awakened sense of public disapproval of the old school methods of tariff making will bring about an early reckoning with the voters.

There should be an honest effort to set forth the real facts, without concealment, correct the weak spots and inequalities of the textile schedules where they exist, so that they may afford the reasonable, consistent and just measure of protection that is absolutely needed—and no more. Then they can be successfully defended by an industry united in the conviction of a just cause.

In June, 1909, we gave the interview between Senator Dolliver and the editor of this magazine, prefacing it with some remarks on the necessity for protection, from which we take this extract:

The United States, for reasons it is not necessary to discuss here, is a country in which the money cost of production is high, making protection against cheap foreign labor necessary for the welfare of the people here. Because a protective

tariff is thus essential to the welfare and happiness of the American people it should be the constant aim of every patriot to defend the protective policy against all attacks and especially to prevent it from being discredited by defects in its application. Among such defects are excessive and unequal rates, protection to special interests, and discrimination against special classes of producers or consumers. It has been as a defender of true protection against these evils which threaten its existence that, since the American people ordered the tariff to be revised, we have endeavored to place the facts regarding the textile tariff before our readers.

At the beginning of July, 1909, it was evident that the tariff bill would pass both Houses with but slight changes in the Senate draft of the textile schedules and so in our issue of that month we reviewed the situation, saying among other things:

The result (of the tariff revision) will be an incident in the working of popular government. The success of our form of government depends upon how well the individual in private and public station does his duty. We will all rejoice if the result is good. If bad we may be reasonably sure that the responsibility will rest on those who fell short in doing their duty.

On Aug. 5, 1909, the Payne tariff bill became a law, and we will close this series of extracts from our files with one from the comment in the issue of that month:

With the passage of the Payne bill by Congress and its approval by the President, both of which results appear probable at this writing, another stage in tariff revision is reached, during which the law is put into effect and receives the approval or disapproval of the people. This is the last and most critical period in the making of a tariff bill. If it meets with popular approval in the months following its enactment into law it obtains a lease of life which ensures its having a fair trial. But if during the first months of its existence as a law it falls into popular disfavor, it is likely to be short lived. Whether the Payne bill is to be long lived or not can be determined with reasonable certainty from the trend of public opinion during the next twelve months.

We do not publish these extracts here at this time because of our pride of opinion, although we take a natural satisfaction in having been right. We publish them in order to refresh the memories of some who now show a disposition to forget. As one now reads these editorials during the ten months from November, 1908, to August, 1909, the conviction becomes irresistible in the light of existing conditions that the textile trade would have reaped immeasurable benefit if the advice of the Textile World Record had then been followed.

Who were the truest friends of the textile trade, we, who told unpleasant truths and gave unbiased counsel when there was yet time to heed it, or those whose policy was to stand pat on an admittedly defective tariff in the face of an insistent demand for revision from 90,000,000 inhabitants of a free country?

Who were the wool growers' and worsted spinners' truest friends, we who urged them to make the wool and wool goods tariff fair to all branches of the trade in 1909, or those who under present political conditions in the United States persuaded them to keep it as it was?

Who was the truest friend of the textile trade, we, who gave advice which, if followed would have enabled textile manufacturers now to face a discontented public with the textile schedules based on justice to all producers and consumers, or those who succeeded in enforcing their contention that the textile schedules were so complicated they should be left alone?

No part of the responsibility for the tariff troubles in which the textile trade is now embroiled rests on those who pointed out the right way and gave the warning in time.

Our tariff record speaks for itself. It was made without prejudice for or against any interest, but solely in the interest of a square deal for all. It is voluminous. It represents much hard work. Attempts have been made to obscure and to discredit it, but up to the present moment not one word of it has been successfully refuted. The character of the comments by those who would discredit it is illustrated by this statement published recently in the "Textile Manufacturers' Journal":

It is true that Mr. Dale's figures have been previously branded as authoritative by Senator Dolliver and other insurgent Congressmen in their attacks on schedule K, but less biased persons are apt to give quite as much credence to the contradictory evidence presented to Congress by a large number of representative manufacturers, among them being: Frederic S. Clark, president Talbot Mills; F. T. Maxwell, treasurer Hockanum Co.; John Simson, superintendent Globe Woolen Co.; George A. Kunhardt; A. M. Patterson, presi-

dent Waterloo Woolen Mfg. Co.; F. C. Fletcher, treasurer Pocasset Worsted Co.; Ferdinand Kuhn, treasurer Botany Worsted Mills; Julius Forstmann, president Forstmann-Huffmann Co., and many others.

To concede that misstatement to have been honestly made leaves the alternative that the writer had made no investigation of the question he was discussing, but had accepted what was handed to him. Instead of being "contradictory" the testimony of Messrs. Clark, Maxwell, Simson, Kunhardt, Patterson, Fletcher, Kuhn, Forstmann and the many others, as presented to the Ways and Means Committee, is in every respect corroborative of our statement of manufacturing shrinkage. The only difference between their reports and ours is that ours cover a wider range of wool shrinkage and fabric structure, including cotton and wool mixed as well as all wool goods, and are, therefore, a more complete exhibit of manufacturing conditions. This is made evident by the following comparison of shrinkages reported by the eight above-named gentlemen with those given by us in our issues of January and February, 1909:

HOW MUCH WOOL TO MAKE A POUND OF CLOTH?

Before the Ways and Means Committee.

Frederic S. Clark	lbs. grease	3.52
F. T. Maxwell	lbs. yarn	1.23
John Simson	lbs. scoured	1.42
John Simson	lbs. scoured	1.54
John Simson	lbs. scoured	1.40
George A. Kunhardt	lbs. scoured	1.28
George A. Kunhardt	lbs. scoured	1.20
A. M. Patterson	lbs. scoured	1.50
F. C. Fletcher	lbs. tops for 1 lb. yarn	1.11
Ferdinand Kuhn	lbs. scoured	1.54
Ferdinand Kuhn	lbs. scoured	1.67
Julius Forstmann	lbs. grease	3
Julius Forstmann	lbs. grease	4.2

Textile World Record.

January, 1909	lbs. grease	1.90
January, 1909	lbs. grease	1.08
January, 1909	lbs. grease	2.33
January, 1909	lbs. grease	2.31
January, 1909	lbs. grease	.36
January, 1909	lbs. grease	.16
January, 1909	lbs. grease	2.08
January, 1909	lbs. grease	.34
January, 1909	lbs. grease	1.11
January, 1909	lbs. grease	3.95
January, 1909	lbs. grease	3.95
February, 1909	lbs. scoured	1.27
February, 1909	lbs. scoured	1.54
February, 1909	lbs. grease	6.38
February, 1909	lbs. grease	5
February, 1909	lbs. grease	4
February, 1909	lbs. grease	3
February, 1909	lbs. grease	2.38
February, 1909	lbs. grease	1.88

We give this comparative exhibit in order that the uninformed may not be deceived by the "Journal's" little fling.

There are, however, real arguments regarding the textile tariff, written by able and studious men, which might at first reading convey the impression that they conflict with and refute the statements made by ourselves. Such is the article by Charles Heber Clark, of Philadelphia, which appears in this issue, taken from the "Saturday Evening Post." So far as his main contentions are concerned we are in complete agreement with Mr. Clark. We can have no argument with him over free trade and protection, because he is as confirmed a believer in protection to American industries as we are. We shall not question his contentions as to whether the foreigner pays the tax; the liberality involved in the Homestead Act; the effect of the tariff on paper, sugar or steel; nor the significance of the enormous immigration from Europe; for these matters have no bearing on the question of whether inequalities should or should not be removed from a protective tariff.

Mr. Clark, however, discusses the textile tariff, and here we find the apparent conflict between his views and ours. Briefly stated his contentions are that the tariff tax on wool cloth is but a trifling amount, 75 to 90 cents on a suit, or $2 to $2.75 per year, and that there "is not strong temptation to stuff the fabric with cotton and shoddy." Here again we have no dispute with Mr. Clark so far as the tariff charge per suit is concerned. He will find his own statements on this point confirmed in an editorial article, "A Difficulty with the Woolen and Worsted Business," which appears on another page, written before Mr. Clark's article was received.

When it comes to the question of adulterating wool goods with cotton and shoddy we are compelled to differ with Mr. Clark. The intense pressure for low priced fabrics for the clothing trade, and the desperate struggles of the manufacturers to get up something to meet a price are notorious and

deeply to be regretted facts. Mr. Clark has only to visit the manufacturers of carded woolen and worsted goods in his own city to discover facts that would lead him to change his views in this respect. The clothier strenuously insists on the lowest prices and the largest discounts, and often obtains additional concessions by claims that are conceded, not because they are just, but because resistance would mean a larger loss. Cloth for ready made clothing is bought, not in suit lengths, but in substantial quantities on the price of which the last cent is exacted.

We also differ with Mr. Clark in his assumption that the effect of the wool tariff can be measured in dollars and cents per suit. It cannot. The manufacturer is forced to adulterate his cloth, which is made into, say a fifteen dollar suit. The value of the entire suit, represented by trimmings, tailoring, cloth, transportation and profits, as it is sold to the ultimate consumer, depends on the quality of the cloth in which the raw material may not have cost over seventy-five cents. If the cloth manufacturer is forced by unequal tariff rates to use adulterants the result may easily be that two suits will be required to equal in service one that can be made at a trifling or no increase in cost with the inequalities in rates removed.

If Mr. Clark will consider these suggestions we are confident that he will find himself in complete agreement with us, not only as regards the fundamental issue of free trade and protection, on which there never has been any disagreement, but also as regards both the details to which we have just called attention and the real issue now before the country, whether protectionists shall unite to correct the inequalities of the protective tariff or run the risk of turning that tariff over to its enemies.

The tariff problem is now in the hands of an independent tariff board who are investigating the facts of costs in this country and abroad. We hope they will be able to present such facts to Congress as will enable it to frame a protective tariff fair to all branches of the industry and to the consumer. If the fundamental principles laid down by President Taft are carried out as the Republican party has pledged itself to do, and the manufacturers cooperate in giving full information to the board, we think the textile industry has little to fear from the results.

THE NEW TARIFF AS ITS FRIENDS SEE IT.

By CHARLES HEBER CLARK in the Saturday Evening Post.

There is a kind of man who always takes a small view of a large subject. If you shall speak to him of the glory of religion, of the splendor of sacrifice, of the beauty of holiness, of the sweetness of Christian love and of the inspiring heroism of the noble army of martyrs, he will answer: "Yes; but it costs me ten dollars a year for pew rent."

Turning from spiritual things to material things, you may point him to an economic policy framed by one of the most illustrious of the founders of our Government, sanctioned by Washington and a long line of mighty statesmen, Lincoln among them—a policy with which this nation has grown to industrial greatness without precedent in the history of mankind—and our narrow friend will answer: "All very well; but it makes me pay a cent a pair more for stockings and ten cents more for a hat."

I shall not contend that the costs of living are too despicable for attentive consideration. I do contend, however, that no man can estimate a vast national concern by looking at a single aspect of it. If you would perceive the beauty of the architectural proportions of a noble building, do not glue your eye to a single brick.

It will be denied that the protective policy has helped this nation to unequaled industrial power. But no man can prove that it has not made this achievement; and I can prove not only that all forward movement in this country is coincident with the existence of this policy, but that no nation, at any time, has acquired true industrial strength without the aid of tariff protection.

I challenge contradiction of that declaration.

OUR DOUBLE ROLE OF PRODUCER AND CONSUMER.

To begin with, let me protest against the oft-repeated attempt to divide the people into separated classes of producers and consumers. There can be no such division. Every man not a mere tramp is both a producer and a consumer.

The brakeman on a train, the man who drives a cart, the clerk in the bank, are producers. Even the idle rich man is a producer, for his money works, and must work, for him. Should some tremendous cataclysm suddenly destroy every manufacturing industry in the great state of Pennsylvania it would hurt in his pocket every honest man in the United States. As the Apostle said, long ago, "We are members one of another." All of us are more or less dependent upon each of us.

The vital need of our Government is assured revenue. The Government is not a producer. It is a protector and cherisher of the interests of the people. The revenue must come from the earnings of the people. It is an excise—something cut off from the earnings of those who do produce wealth.

This taxation may be done in several ways. Great Britain, with less than half our number of people, collects as much revenue as we do.

Her method is to tax the people directly, reaching far down into every pocket and, meantime, letting in free, through her custom houses, the products of the industry of other nations.

Our method, which takes from the people fifty cents where England takes a dollar, is to make the levy largely by requiring the foreign producer to pay for a license to enter our market for the purpose of competing with the domestic producer.

The result is twofold. First, the tax is taken in part indirectly from the citizen and often without his consciousness; second, the foreigner is compelled to pay a part of the tax for the privilege of admission here.

It is a not uncommon delusion that the customs duty is always added to the American price. The truth is that in many cases the American price, with duty added, is no higher than the foreign price.

Here are a few proofs of this fact. Last spring Congress removed the duty from hides. At once the exporters in Argentina advanced the price of hides to the extent of the withdrawn duty. A few years ago, in response to a popular cry for "a free breakfast-table," the duty was taken off of coffee. The Government of Brazil instantly added it as an export duty. In both cases our Government surrendered revenue which was pocketed promptly by foreigners, and the American consumer had no benefit of any kind.

The McKinley tariff first imposed a duty of 2 1/2 cents a pound on tinplate, which then was selling for $5.34 a box. The foreign price at once dropped to $3.30 a box. Who paid that duty?

In 1871 steel rails sold for $102 a ton, and a duty of $28 a ton was laid. In 1894 the price dropped to $29.92. Who paid that duty? In 1883 the duty was reduced to $17 a ton, and in 1898 the price fell to $17.62. Who, also, paid that duty?

An importer whom I know paid $1 for a German linen article when the duty under the Wilson tariff was 35 per cent. Dingley put up the duty to 50 per cent. and the German exporter, rather than lose his trade, lowered his price to 90 cents. Who, I ask, paid the increased duty?

I assert it to be the rule, with exceptions, of course, that the prices of European articles are lowered so that the American market may be reached. The result is that, in many cases, the American not only pays little or no more here than he would have to pay in Europe, but the European actually relieves him from a part of his taxation. The tariff, then, actually saves money to masses of the American people.

I may extend this matter a little further. The duties upon steel rails have indeed been high. But, under those duties, we have built one-half the railway mileage of the world; and whereas the average freight per ton in Great Britain is about 3 cents a mile, in the United States it is—conducted over those very rails—four-fifths of a cent a mile, or the lowest rate in existence.

In what manner, then, has a high duty upon rails hurt the American citizen?

HOW TARIFF FIGURES MISLEAD.

I do not intend in this article to deal largely with percentages. I prefer exact final figures. Resort to what has been called "the percentage trick" is a favorite practice with those who would mislead plain people. Percentages do not always, by any means, indicate prices. You tell a man that some common article of necessity bears a duty of 120 per cent., and he is startled and angry.

He will not reflect that as percentages go up prices may be going down. When the price of tinplate was, say, $5 per 100 pounds, a 2 1/2 cents duty was a 50 per cent. duty. When the price of tinplate declined to $3.30 per 100 pounds the very same duty became a 76 per cent. duty.

If stockings, valued at $1 a pair, had a specific duty of $1, the tax would be 100 per cent. When —the duty remaining fixed—the price of the stockings fell to 50 cents a pair, the duty would be 200 per cent. If the stockings should fall to 10 cents a pair, the fixed duty would be 1,000 per cent.

The important question, of course, is not at all what is the percentage of duty upon stockings but what do you have to pay for a pair! You can buy, today, two pairs of good half-hose for 25 cents, and there is no peril in the assertion that never since the world was made could you get, tariff or no tariff, so good hosiery for so little money.

The reasons are, first, that the home supply is abundant and excellent, and second, that the Americans, solely because the industry—and therefore the incentive—was here, have invented the most wonderful and productive knitting machinery.

A part of the contention of the free trader just now is that prices have, of late, seriously advanced, and that the tariff is to blame for it. But how shall he prove his case? Rubber, within two years, has gone up from 69 cents a pound to $2.15, but rubber is, and always has been, on the free list. Cotton, within the same period, has risen from 8 1/4 cents a pound nearly to 16 cents; but obviously no tariff duty can affect the price of cotton. The price of hides advanced as soon as we took the duty off. Iron duties have been reduced 40 to 50 per cent., but iron prices have gone up. Sugar duties have been cut, but sugar prices are greater. If the prices of these things have gone up without influence from the tariff, why should we believe that the tariff has lately advanced the cost of woolens when there has been no change of any kind in the duties upon woolens, excepting to lower them?

Manifestly these increases, noted the world over, are not produced by our tariff legislation. We may seek, perhaps, for the impelling force in high prosperity, stimulating consumption, or, as some wise men do, in the extraordinary development of the world's supply of gold.

OUR OLD FRIEND, THE FARMER.

But why should the Government give aid and comfort, through the instrumentality of a tariff

law, to a single class of citizens—the manufacturers?

The aid is to be given, of course, where it is needed. Builders, lawyers, retailers and so forth, are sufficiently protected by Nature. The manufacturer gets help where it is required. The farmer, also, let us note, gets it far more abundantly when he requires it.

Do you ever reflect upon what our Government has done, and now does, for the American farmer?

Millions of farms were given, years ago, to the farmers, absolutely without charge. The Government never gave a mill to a manufacturer. Other millions of farms have been sold by the Government, and now are selling, at the lowest of low prices.

The nation maintains an Agricultural Department—the manufacturers have no department—which costs from ten millions to twelve millions a year. This department not only distributes vast quantities of seeds, but also it instructs the farmers, analyzes their soils, improves their animals, destroys at great cost the cotton boll-worm and injurious insects, and helps them to stamp out diseases in plants and animals.

Hundreds of millions are spent in constructing irrigation works so that poor land may be redeemed for the farmers; and in divers and sundry other ways the American farmer is assisted, encouraged, upheld and made the object of incessant large expenditure.

No man may complain of this. It is well done. That is what a Government is for—to do for the people the things they cannot do for themselves. We are the Government! The money is ours. All these toilers are our brethren. All are Americans. Their welfare is our welfare. The soil feeds every man of us. The huge expenditure for the splendid development of agriculture is an investment of a common fund for the benefit of all.

But, if this be true for the farmer, why is it not true for the manufacturer? The farmer, rightly, gets enormous sums of money as a gratuity from the Treasury, and he is the constant object of solicitous, almost maternal, attention.

What does the manufacturer get? Absolutely nothing but shelter for his business from a powerful foreign rival, whose highest felicity would be the annihilation of his American competitor.

If it be worth while to spend hundreds of millions every year for battleships, in making ready for a gunpowder war that is likely never to come, why is it not well to employ for our protection our law machinery for service in a commercial war at this very moment raging the world over?

Commerce is indeed war, and merciless war. No tidings could bring to Europeans a thrill of joy equal to that which would come to the Old World if announcement should be made that one-half the manufacturing power of the American nation were wrecked and ruined, and finally and forever wiped out of existence.

Now let us consider a few specific cases of articles concerning which tariff protection has been complained of.

THE CASE OF THE UNIVERSAL SWEETENER.

The duty upon sugar has given much offense to the advocates of free trade or of severe tariff reduction. What justification is there for continued imposition of that duty?

It was laid not only for the sake of obtaining needed revenue but also for the purpose of promoting the production of beet-root-sugar in this country. Many European countries now give bounties directly to the growers and manipulators of that sugar beet for which the world is indebted to the intelligence of the first Napoleon.

The question for us was: Should the farmers directly, and the people generally, have the benefit of the development of the industry in the United States? Clearly it could not live and grow in open competition with the bounty-fed sugar of Europe.

A duty was imposed in the seventies, with the result that now we produce at home, annually, beet sugar to the value of nearly fifty million dollars. Thus the farmers had a new and profitable crop, and the nation came nearer to independence in an important food article.

Before the Civil War—I disregard war prices as unnaturally inflated—ordinary household sugar cost, say, 8 cents at retail. Now a better sugar may be bought for 5 1/2 cents a pound. Some day we shall grow all of our sugar supplies. Why not, if we would deal fairly with the subject, instead of scoffing at the small saving to each person made possible by the recent reduction of the sugar duty, look at the matter in this way:

The difference between 8 cents a pound and 5 1/2 cents is 2 1/2 cents. What is the worth to the nation of a saving of 2 1/2 cents a pound on all the sugar consumed by 90,000,000 of the most prosperous people on earth? Beet sugar made that reduction in the price. Were there now as in the old time nothing but sugar from the cane, the price not unlikely would be 15 cents and, perhaps, 20 cents.

The duty on paper and the wood pulp from which paper is made has been made the subject of much acrimonious complaint. So far as the matter involves Canada, that country, by imposing an export duty upon paper-making wood, is simply striving to compel us to let her make all our paper. We are asked to permit her to force American paper manufacturers to go out of business, or to move their machinery across the border.

Who is willing to allow Canada to control in such a manner our business affairs or our fiscal policy?

An attempt is made to scare us by the declaration that Canadian discrimination against us in taxing wood and pulp for export will compel us under the new tariff law to impose the heavy maximum duties upon all Canadian products. This would ruin our import trade with the Dominion.

The truth is that, as Canada's export duty is levied upon exports to all lands, there is no literal discrimination against us; and I have the authority of a member of the Ways and Means Committee, which framed the tariff, for saying that imposition of the maximum—or retaliatory—duties upon Canadian products is an impossibility. But what interest has our dear old friend the consumer in the paper and wood-pulp controversy? We must consider him.

What happens to the consumer because of the wicked and semi-barbarous paper and pulp policy

is that he actually gets his daily paper at a lower price than is paid by any other man in any land upon the rolling earth. Nowhere but here is the one-cent daily newspaper in successful, large existence.

Who, then, suffers? Not the consumer. Does the newspaper publisher suffer? If so, why does he not put up his price to two cents, or to five cents? Nobody can hinder him. His blank white paper costs him more, if you please, than he gets for it. How, then, does he come out with a profit? His advertisers save him and sometimes make him rich.

But are the advertisers complaining? Not that anybody hears. They are satisfied, the buyers of the journals are satisfied, and the publishers have prosperity if they deserve it. Shall we, under such circumstances, kick a hole in the protective system, bankrupt papermakers, and force a great domestic industry to emigrate?

We may safely intrust that question to the sound commonsense and the solid equity of the American people.

I come now to the consideration of an article around which the fantastic imagination of the free trader has played tricks in which ingenuity expends itself in contriving surprising varieties of mendacity. Ananias, Baron Munchausen and Count Cagliostro are not in the game with the delirious free trader when he sets himself to consider the homely article of wool.

Recall the fact that the Government must have income. Then take the further fact that import duties upon wool and woolens have put two hundred and ninety-three million dollars in the United States Treasury within eleven years, and you have an apology for the wool duties that might be regarded as about covering the case.

Now take another fact of no contemptible significance: The presence in this country of millions of sheep means not only wool but mutton chops, and hind and fore legs, and all the other sheep-meat requirements. That the presence here of this great supply of flesh food tends to keep down the prices of other flesh food—beef, pork, poultry and so forth—will not be questioned.

DEAR WOOL AND CHEAP MUTTON.

There are level-headed economists who steadfastly believe that this depression of prices produced by the domestic mutton supply has, throughout the long years, fully compensated for all the duties paid at the ports for wool and woolens. In fact, all of the wool tax has been offset completely by the decrease in the price of flesh food.

I am bold enough to assert that on my own account as a practically incontestable fact.

But, says the free trader, we should have had the sheep if wool had been upon the free list. It is always fairly safe to guess about might-have-beens. Let us grapple with some solid facts. Mark this one. The number of American sheep has always increased or decreased as the wool duties were sufficient or insufficient in size. I must inflict some figures on the patient reader. Let us take a period of forty-two years, from 1867 to 1909:

Tariff of	Wool duty Per lb.	Number of Sheep
1867, last 4 years	12½ cents	25% increase
1883, 6 years	10 cents	16% decrease
1890, less than a year ..	11 cents	10% increase
1894, less than a year ..	Free wool	21% decrease
1897, 12 years	11 cents	46% increase

These figures show, beyond controversy, that whenever the duty on wool went below eleven cents a pound American sheep were killed off and the flocks—and the mutton supply—decreased. They prove that the flocks always enlarged when the duty went to or above eleven cents a pound. In other words, they supply what I may call final evidence that the American farmer will not herd sheep unless he has tariff protection enough to give him a decent price for his wool product.

This downward movement of the flock dimensions, under inadequate duty, seems to me to show that no duty at all, or free wool, will produce ultimate extermination of the American sheep. Does it not clearly indicate just that?

We grow here three hundred million pounds of wool, which is one-eighth of the world's clip. I ask reasonable men, not blinded by prejudice, but fair and wise enough to regard a great matter in a large way, this question:

If you destroy one-eighth of the world's wool supply will not the remainder rise in price? And will not that rise take much more money out of the pockets of the consumer than all that has ever been taken by tariff duties?

It is indeed almost a question of simple mathematics. Scarcity means high prices. Moreover, what must be the condition of a mighty nation dependent for a vital necessity upon foreigners? I am convinced that the power to grow most, if not all, of the wool we need would be cheaply purchased if we could get it only by giving bounties directly to the wool growers, as France does to her sugar-beet raisers.

Furthermore: If it be wise to spend tens of millions to help the farmer to water his fields, to kill his bugs, to improve his stock, to learn the best methods of tillage, why—oh, why, indeed!—is it not worth while to levy a small duty at the ports, so that he may supply his fellow-citizens with material for clothing?

THE DIMENSIONS OF THE WOOL TAX.

What does the duty on wool amount to when the clothing reaches the consumer? What is this dreadful burden that the tariff puts upon the suffering poor man?

An ordinary suit of $15 or $20, made wholly of wool, contains from seven to eight pounds of that material. The duty is 11 cents a pound and, therefore, the tax on such a garment is from 75 to 90 cents. The suffering poor man aforesaid, and the joyful poor or rich man, pays that much on, say, three suits a year, for the sake of his beloved country, of the horny-handed farmer, of the mutton butcher, the United States Treasury and the good old cause generally.

I put the tax at $2 or $2.75 per annum, and small indeed it seems when we consider the resounding,

far-reaching, long-drawn-out and long-continued ululations which it has brought from the vocal organs of free-trade complainants. One might think, from the volume of the racket made, that the wool tax appropriated quite half of the afflicted poor man's income. It amounts, probably, in a year to what he pays for tobacco in a month.

This is the duty on raw wool; now, how about the cloth that consumes the wool? I will put the facts in this form: An all-wool cloth sold for $1 a yard gives a profit of 5 cents a yard to the manufacturer: not a robber portion, surely! When the cloth goes into a suit of clothing that profit will not equal 17 cents. Thus:

In a three-piece suit retailed for $12, the cloth—all wool—costs about $3. In a similar suit sold for $15 the cloth costs $3.75. In a $20 suit it costs $5, and in a $30 suit $7.50.

Surely here is not strong temptation to stuff the fabric with cotton and shoddy, of which we hear such wild free-trade lamentations. I do not say that cotton and shoddy never are used; but then, either the cloth is sold for cotton and shoddy, at cotton and shoddy prices, or the dealer is a knave; and even conditions of free trade would not avail to stop rascality. England, with free trade, produces more shoddy than any other country.

I will push the case a little closer. If these are the facts concerning the raw wool and the cloth, where lies the cause for the difference in cost between the cloth and the completed $20 garment? It lies, in my judgment, with the retailer. This gentleman, with a perfect right to do his best for himself, and requiring margin for the familiar late-season "marking down" of suits anywhere from 25 to 50 per cent., appears to make a handsome thing of it.

I learn that he pays, say, $7 for a suit that he sells for $10, which means that his ordinary profit is somewhere about 43 per cent. on that one transaction. Besides, if he is a prompt payer he probably gets a discount from the wholesale dealer. On suits retailing at $18 and $20 he probably makes a profit of 50 per cent., and the profit will go higher as the price rises.

I find no fault with this. The suits are in most cases worth to the wearer what he pays for them. But I do protest against the injustice of holding the wool-grower, the spinner, the cloth-maker and the tariff responsible for a matter that lies solely between the suit-seller and the suit-wearer.

In any case this fact may be noted: the American workingman wears better clothing than any other man in the world of his class, because, under the protective system so fiercely denounced, he earns more money with which to pay for his necessities. It would not be, indeed, hazardous to conjecture that American workingmen wear more unadulterated woolen stuffs than all the other workingmen of all other races put together.

Thus, when you look this wool and woolens monster in the face, he is not such a hideous creature after all!

THE COST OF LIVING.

A familiar complaint against the tariff is that it increases the cost of living, making that cost much greater than it is in Europe. But what kind of living? A European laborer, who lives in a mud cabin, wears wooden shoes and eats meat twice a year, does indeed live cheaper than an American workman who—as multitudes do—owns a brick house with a bathroom, a Brussels carpet, a piano and electric lights, and who wears fine clothes on all idle days. The American pays more, maybe, but he gets more; and that, dear brethren, is the only way in which any man can account for the stupendous fact that within eighty years 23,000,000 European laborers have come over here to live. They know what the difference is. They have learned where the poor man's good things are, tariff or no tariff.

But, indeed, is living here so very much dearer than it is in the best European countries? I doubt it, quality for quality.

Take a brief glance at the subject. More than 40 per cent. of a workingman's expenditure is for food; and that food, by and large, is cheaper here than in Europe is finally proved by the fact that all Europe comes here to buy food.

House rent consumes about 15 per cent. of such a man's income. But there is no tariff duty on houses, and the rent is higher because the house is better. Clothes take another 15 per cent., but the larger part of men's, women's and children's clothing is cotton, and we beat the world on the three-fourths of the world's supply of cotton that we grow in American fields.

Fuel calls for 9 per cent. of the man's income, and we have coal in illimitable quantities, the laborer's supply being unaffected by the tariff. Light consumes 5 per cent. and our oil is the cheapest of all lights. About 16 per cent. is spent for sundries, car-fares, church and club dues, newspapers, magazines and personal enjoyment, with none of which has the tariff anything to do.

I take the liberty, therefore, of doubting whether living here really costs more, surely not much more, than it does in Europe, if you consider what a man gets out of it in this better country. If the world holds a poor man's Paradise, assuredly here it is in this tariff-afflicted, solidly protected but rich and glorious and surpassingly happy country of ours.

I say that the theorists who never come into contact with industry, who have never penetrated below the skin of the facts, who would rather find fault than be fair—the academic people, the people who merely work it out in their minds with their eyes shut—these are the folks who scoff at and denounce tariff protection and make all the stir and fuss about the injustice of a splendid, century-old national policy.

Finally: The accusation is urged that the Republican party promised to revise the tariff downward and failed to make good.

No such promise was given. The plank in the platform is too long for insertion here, but I will let President Taft—in his speech at Winona—tell the truth about it.

"The promise of the Republican platform was not to revise everything downward. . . . I did not promise that everything should go downward. . . . The proposition of the Republican party was to reduce rates so as to maintain a difference between the cost of production abroad and the cost

of production here, insuring a reasonable profit to the manufacturer on all articles produced in this country. . . . I did not agree, not did the Republican party agree, that we would reduce rates to such a point as to reduce prices by the introduction of foreign competition."

THE TARIFF AN ARTIFICIAL DEVICE.

The plank referred to promised to consider the "difference in the cost of production" between this country and other countries. But who shall with precision determine that difference? There is one difference as between us and England, another in the case of Germany, and quite another in the case of Japan. And all the time these differences are fluctuating with costs of material and other costs.

What we require are duties high enough to cover all cases and all upward and downward movements. We want the protective principle firmly established and in continuous operation, so that our own producers may conduct their business in peace and with decent profits.

Judging by the successive Congressional elections, that is what also the great majority of the American people require.

Often I have heard the objection made to the protective system that "it is artificial." It is indeed! Artificial! Why, civilization and law and government are artificial! The only unartificial and perfectly natural people are the naked Africans at this moment running about the torrid zone eating one another and having, one would think, a mere minimum of fun.

All the arts and sciences, all books and pictures and vehicles and machinery are artificial. Our railroad trains, telegraphs, telephones, electric lights, our houses and clothes and churches and other comforts, are artificial. Fertilization of the earth, improving the quality of fruits, breeding fine animals by selection—in short, all the things that make life secure, pure, progressive, uplifting and happy, come to us not by nature but by artifice.

The tariff is indeed "made ground." It is not unlike the Holland dikes, which also are artificial. The dikes keep out the sea, and the law keeps out anarchy, and the tariff keeps out destructive foreign competition.

Were these defenses not in existence, the sea would flood the Dutchmen, anarchy would swamp our nation, and the foreigner would shut our mills and force our people into idleness, as millions are at this very moment idle in the free-trade Eden of England.

The American free trader, who abhors artifice and who wants to live the life of a simple child of Nature, will have to go off to the African cannibals, or hie him to a desert island where he can have his own sweet will all by himself.

The value of all manufactured products in the United States returned at the census of 1905 was nearly $15,000,000,000. Of this amount, textiles constituted $1.200,000,000 and cotton goods $450,000,000.

EVENTS OF INTEREST IN THE TEXTILE TRADE.

September 3. The strike involving 70,000 cloak makers in New York is settled by an agreement negotiated by Louis D. Brandeis of Boston. The agreement provides for an open shop with preference given to union workers, making what is known as the "preferential shop." The strike lasted for nearly ten weeks.

September 8. End of the strike among the building laborers on the new mill construction at New Bedford, the men resuming work under the same conditions as prevailed before the strike. About 600 were involved in the trouble.

September 8. End of the slasher tender strike at New Bedford which had lasted for about 4 months and involved 100 operatives.

September 9. The Treasury Department practically decides to modify the ruling regarding samples of foreign textiles to be supplied to American consuls abroad.

September 15. The National Association of Cotton Manufacturers begins its 89th semi-annual meeting at Hotel Wentworth, New Castle, N. H.

September 15. Seizure by the Government of about $25,000 worth of woolens shipped by a Bradford firm to their New York branch house.

September 17. German manufacturers in convention appeal to the German government not to renew the patent agreement with the United States which expires by limitation in 1911.

September 17. The Pennsylvania underwear manufacturers meet at Reading and confer regarding the state of the trade. The sentiment among those present was strongly in favor of a campaign to educate knit goods manufacturers in estimating correctly the cost of their products so as to prevent selling at a loss.

September 20. About 250,000 pounds of fine American wool is bought in Boston by a London firm for export. This is a trial lot representing a large line of domestic wool.

September 20. The textile schools at Fall River and New Bedford decide to give

evening courses of instruction in textiles to young men and women employed in dry goods stores.

September 22. The Middle States Textile Manufacturers' Association is organized at Louisville, Ky.

September 26. The tariff board meets at Washington to form plans for the investigation of the tariff. Special attention is to be given to the textile schedules.

September 27. Southern manufacturers controlling six million spindles decide to continue running on short time until cotton and goods prices reach levels at which a profit to the manufacturer is possible.

October 1. The cotton employes in Lancashire declare a lockout that affects about 140,000 operatives, as a result of the failure to settle the Fern Mill dispute.

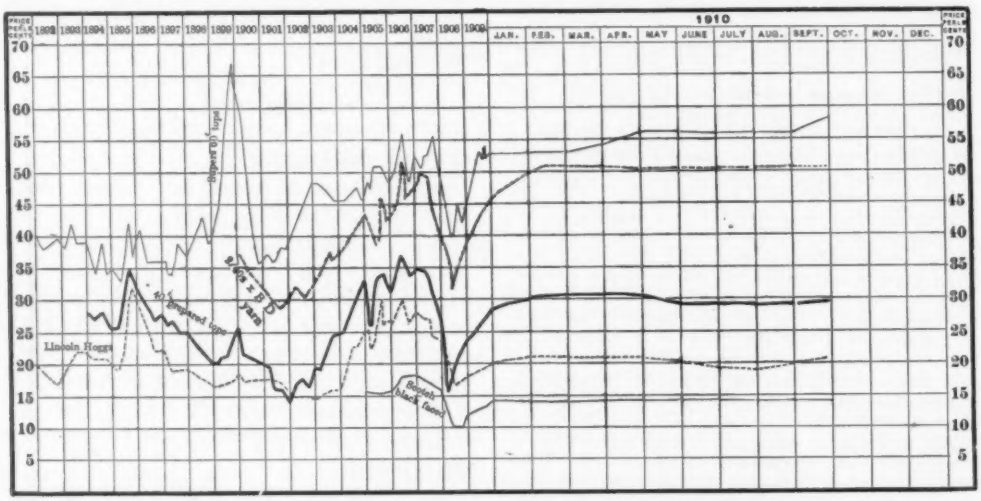


CHART SHOWING COURSE OF PRICES FOR WOOL, TOPS AND WORSTED YARN AT BRADFORD, ENGLAND.

THE BRADFORD MARKET.

(By Our Special Correspondent.)

Bradford, Eng., Sept. 24, 1910.

Makers of tops have been awaiting their cue from the Adelaide and London sales and have not cared to sell forward until the first lot of new clip Australian wool had been into the auction. During the month large quantities of crossbred of every grade have been moved off their hands, and they have kept a very stiff price for merino, of which less has been sold.

There are reports of sales at one cent up for December, but spinners are not as a rule under compulsion to buy. They have supplies and yarn contracts which carry as far as May in some cases and are seeking an advantage before purchasing, although their margins are good.

The crossbred activity is explained by Continental yarn orders, demand for goods of the bunting type, shippers' dress goods and cheap worsteds. The merino business owes most to the men's fine worsted trade, which is still excellent, and to the call for fine linings and dress goods. In the home market Bradford dress goods are going to a discount. Everyone is calling for dress tweeds and anything imitating the Harris style is saleable if in stock.

Some of the pressure on the worsted dress goods mills is being transferred to the woolen districts where the mills were already full of work for the men's trade. The hosiery trade continues to absorb large quantities of yarn and the carpet mills are running at full speed.

The favor extended to short materials shows itself in the noil market, which is slowly improving. Sixties noils are quoted

at 30 to 33 cents; 40s prepared noils, 16 to 18 cents; 40s carded, 14 to 16 cents.

In silk noils which are going in gently increasing quantity to America, it is said that not much movement is being made. Long white Brighouse noils suitable for combing by noil yarn spinners are held for 16 cents, which price the Continental consumers do not choose to pay. Tussah noils are dearer at 18 cents and scarce.

In English wools there is a fair trade generally and dealers' difficulties lie rather in buying than selling. The country markets are dearer than Bradford. Mohairs are firm and mohair spinners have plenty of work.

The prospect of a serious dislocation in Lancashire is troublesome to a district like this which requires so many cotton warps. Quickly on the heels of what was to have been a five years' armistice there has followed a squabble over an utterly trivial detail and both sides are fuming for a fight. The time cannot be well chosen from the operatives' point of view and is less inconvenient to cotton spinners than to spinners' customers.

THE SOUTHERN NEW ENGLAND TEXTILE CLUB.

A largely attended meeting of the Southern New England Textile Club was held at the Warwick Club, near Providence, R. I., last month. Over 100 members and guests were present. This club was organized a few months ago with the object of bringing cotton manufacturers together for an interchange of views and social enjoyment. Since its organization the club has held monthly meetings which have shown plainly that it was supplying a need in the southern New England textile trade. The leading spirits in forming this club were A. W. Dimick, agent of the Fisher Mfg. Co., Fisherville, Mass.; George C. Hinckley, treasurer of the Tilton mills, Valley Falls, R. I.; E. R. Richardson, general manager of the Howard & Bullough American Machine Co., Pawtucket, R. I., Henry C. Dexter, agent of the Greene & Daniels Mfg. Co., Pawtucket, R. I., and Fred W. Howe, general manager of the Crompton & Knowles Loom Works, Providence, R. I. The organization was perfected in July by the election of the following officers: A. W. Dimick, president, Charles D. Robinson, vice-president; George C. Hinckley, secretary-treasurer. The executive committee includes the following members: Henry C. Dexter, Pawtucket, R. I.; Robert Stewart, Lonsdale, R. I.; George Spofford, Blackstone, R. I.; F. L. Chase, Providence, R. I.; F. W. Howe, Providence, R. I.; E. R. Richardson, Pawtucket, R. I.; Alexander Makepeace, Fall River, Mass., and Charles M. Holmes, New Bedford, Mass.

The membership is open not only to mill officials but to those connected with industries allied to textile manufacturing. Meetings are held on the third Saturday of every month. The meeting last month was the largest of any yet held and despite the unfavorable weather which interfered with the field sports, was thoroughly enjoyed by all who attended. A tempting luncheon and a clambake that came up to the Rhode Island standard contributed to this result.

PATERSON INDUSTRIAL EXPOSITION.

An Industrial Exposition under the auspices of the Paterson Board of Trade will be held in the Fifth Regiment Armory of that city November 9-19. As Paterson is the center of the silk industry in the United States, this exposition will naturally devote a large space to the silk and textile exhibits. Indeed, almost half of the large space is to be allotted to that branch. Many silk manufacturers have taken space, as well as collateral lines, representing raw materials, yarns and machinery. An "Ambassadors' night" will be arranged, on which the ambassadors of the raw silk growing countries, Japan, China, Italy and the like, as well as the consuls and vice-consuls, will be invited as special guests, and the Silk Association of America it is hoped will participate in these exercises. George Arnold is chairman of the committee on exhibits.

The exports of hosiery and underwear from Nottingham to the United States in 1909 amounted to $167,904.

PLANS FOR INDUSTRIAL INSURANCE AND OLD AGE PENSIONS.

By CHENEY BROTHERS, So. Manchester, Conn.

In the past both the company and the employes have established as occasions have required various forms of relief for disability. On the part of the company these have not been administered under any well defined system, or in proper relation to each other, and consequently are not tending to serve the ends for which they were designed in the most efficient manner. On the part of the employes such mutual assistance has been limited necessarily to particular groups, and so has not been within the reach of the great majority of employes.

The present plan proposes a mutual and cooperative undertaking by the company and its employes, whereby a comprehensive range of insurance and pensions are made possible for all under equal conditions as regards costs and results. The development of this scheme contemplates the writing of such activities under two general plans: First, the organization of a mutual benefit association managed jointly by the company and its employes for industrial insurance against death and disability; and secondly, the systematic development by the company of old age pensions as assuring a definite return for long, efficient and faithful service.

For the conditions governing these proposals employes are referred to the formal constitution and by-laws proposed for adoption by the contemplated benefit association and to the regulations of the company regarding pensions, both of which can be obtained at the offices of each department. The following description of these plans states in the form of concise questions and answers their more important features.

. . .

What is to be the specific purpose of the Benefit Association of Cheney Brothers?

Its purpose is to provide a simple and easy means, whereby those employes of the company who are willing to set apart about 2 cents out of every dollar earned, may secure to themselves or their families an assured income in the form of certain benefits to be paid in the case of death, sickness, injury, or incapacity from old age.

Who are eligible to membership in the Benefit Association?

Until December 1, 1910, all of the employes of Cheney Brothers, or subsidiary companies are eligible to full membership. After December 1, 1910, employes over forty-five years of age will be eligible to limited membership only, which entitles them to sick and accident benefits, but not to death claims or annuities. The contributions of full members are 2 per cent. of the mean wage of the class to which they belong, and of limited members 1 1/4 per cent.

. . .

How are the contributions of members to be paid?

Contributions are paid monthly in advance and are subtracted from any wages earned, or otherwise are paid in cash.

. . .

By whom will accident benefits be paid?

All accident benefits will be paid by the company, including medical and surgical attendance, and hospital maintenance, where necessary, but will be distributed through the medium of the association.

. . .

To whom will accident benefits be paid?

To members of the association who are injured in the service, unless the injury was due to the member's own wilful and gross carelessness, or disobedience of rules reasonably designed for the protection of employes. Accident benefits will be paid automatically to members only, without any question as to the company's legal liability.

. . .

What will be the specific benefits to be paid for injuries received in the service of the company?

(a) In case of death, three years' wages, and reasonable funeral expenses.

(b) In case of total incapacity, half pay during the continuance of disability, excepting the first three days, for a maximum of six years.

(c) In case of partial incapacity, after the resumption of work, one-half the difference between the wages earned before and after the injury. Such partial incapacity benefits continue for such part of the six years as the total incapacity benefits have not been paid.

(d) In all cases of accidents to members

medical and surgical attendance, artificial limbs and hospital maintenance, where necessary, are provided at the expense of the company.

(e) One per cent. is added to the above accident benefits for every year of service over five; and in the case of married members supporting families, 5 per cent. for each child, until a maximum increase of 25 per cent. is reached.

. . .

From what funds are sick benefits and death claims from sickness paid?

From the contributions of members amounting to 2 per cent. of their average wages for full members and 1 1/4 per cent. for limited members plus a contribution from the company of one-quarter of the amount paid in by the members.

. . .

How are the contributions of individual members fixed and what specific benefits do they secure?

Members are divided into five classes according to their average weekly wages.

In the case of sickness or injuries other than those suffered in the service, they receive one-half of the mean wages of their class for the first fifty-two weeks (excepting the first six days) and one-quarter for the second fifty-two weeks; and in the case of death one-half of the mean yearly wage of their class.

The specific contributions and benefits for each class are given below:

What is done with the balance of the money contributed by members plus the contributions of the company?

It is to be invested and allowed to accumulate into a fund from which annuities will be paid to members when they retire from the service. These are certain payments made to members monthly from the time of their retirement until their death. Members who leave the service after contributing five years can recover that proportion of their contributions which were charged to this fund without interest. The dependents of members who have died before becoming entitled to an annuity can recover with compound interest at 4 per cent. Female members may at the time of marriage recover the proportion of their contributions charged to this fund with compound interest at 4 per cent.

. . .

To whom upon retirement from active service may annuities be paid and in what amount?

(a) To men over seventy years of age and women over sixty years of age, who have been contributors to the fund for ten years.

(b) To men over sixty-five years of age and women over fifty-five years of age who have been contributors to the fund for fifteen years and who are retired.

(c) To men or women of any age who have been contributors to the fund for twenty years and who have become permanently incapacitated for further work in the service of the company.

No annuities can be paid under the plan

SCHEDULE OF SICK AND DEATH BENEFITS.

CLASS		A	B	C	D	E
Those receiving weekly	more than		$7.50	$12.50	$17.50	$22.50
	not more than	$7.50	12.50	17.50	22.50	
Mean wages of class		$5.00	$10.00	$15.00	$20.00	$24.00
Benefit per week	1st 52 weeks	$2.50	$5.00	$7.50	$10.00	$12.00
	2nd 52 weeks	1.25	2.50	3.75	5.00	6.00
Death Claims		$130.00	$260.00	$390.00	$520.00	$624.00
Weekly contribution	2% of mean wage —full members	$0.10	$0.20	$0.30	$0.40	$0.50
	*1 1/4 %—limited members	0.06 1/4	0.12 1/2	0.18 3/4	0.25	0.31 1/4

* Limited membership buys no death claim.

for ten years, and their amounts will be dependent upon several unknown factors such as the average rate of interest to be obtained on the investments of the association, the average age of entering and retiring, and the number of withdrawals. It is conservatively estimated that they will be as follows:

MONTHLY ANNUITIES OF CLASS A.

Age at Retirement	YEARS CONTRIBUTED								
	10	15	20	25	30	35	40	45	50
70	...	...	...	$1.60	$2.21	$2.98	$3.93	$5.12	6.58
65	...	....	0.83	1.19	1.64	2.20	2.89	3.75	...
60	...	$0.44	.67	.96	1.31	1.75	2.30	....	...
55	$0.22	.38	.57	.81	1.10	1.47	....	....	...
50	.20	.33	.50	.71	.96	....	....	....	...
45	.18	.30	.45	.63	....	....	....	....	...

The annuities of Classes B, C, D and E are respectively 2, 3, 4 and 5 times those of Class A.

It is estimated that the monthly annuities of women will be 10 per cent. lower than those of men, because the average term of life of a woman over fifty is longer than that of a man. The same amount in the total will be paid to women as to men, but it will be distributed over more payments.

. . .

By whom are the affairs of the Association managed?

By a board of trustees consisting of eleven members, of whom Cheney Brothers appoint six, and the members elect five.

. . .

Why should Cheney Brothers have the balance of power on this board?

Because they guarantee the payment of sick and accident benefits and death claims, which thereby (being incident to wages) become preferred claims against all of the assets of the company. The company could not justly be held liable for these claims unless it exercised the greater influence over the machinery for carrying out their pledges.

. . .

Is the pension system of Cheney Brothers to be in any way related to the activities of the Benefit Association?

No, except that members of the benefit association only are regularly eligible for pensions. The granting of pensions remains as at present, a sole activity of the company. And while membership in the Association establishes eligibility, it does not in itself create any right to a pension, which is granted at the discretion of the directors of Cheney Brothers as a reward for long, efficient and faithful service.

Pensions may be granted by the pension committee, under the regulation of the directors to the following classes of employes, if members of the benefit association.

(a) To any employe over fifty years of age, who has been twenty-five or more years in the service, and who has become totally incapacitated for further work at any employment or trade; or to those employes as much younger than fifty as they have worked years more than twenty-five, who have become totally incapacitated.

(b) To men, after twenty-five years of service, who are seventy years of age or over; or to men for the same term who are from sixty-five to sixty-nine years of age inclusive and have become incapacitated for work of a like character to their past trade or employment.

(c) To women, after twenty years of service, who are sixty years of age or over; or to women for the same term who are from fifty-five to fifty-nine years of age inclusive and have become incapacitated for work of a like character to their past trade or employment.

What is the amount of pensions?

The amount of a pension is determined by the employes' efficiency as expressed in wages and years of service. It is 10 per cent. of the average actual monthly wages for the ten years preceding retirement plus 1 per cent. of the same amount for every year of service.

(Continued on page 227.)

The National Association of Cotton Manufacturers.

The eighty-ninth semi-annual meeting of the National Association of Cotton Manufacturers was held at Hotel Wentworth, Portsmouth, N. H., on Sept. 15-17. Pleasant weather, a large attendance and an attractive program combined to make this one of the most useful and enjoyable meetings of the organization.

The journey between Boston and Portsmouth on the special train was not the least enjoyable of the features of this pleasant trip. It afforded an opportunity for the members of the party to become well acquainted with one another and formal barriers were soon broken down and the journey came to an end all too quickly.

The social features of the autumn meeting are always a pleasant and a prominent part of the proceedings. The delightful weather and beautiful surroundings, with so many opportunities for side trips, enticed many of the members away from the more serious business of the meeting. Portsmouth abounds in historical points of interest and on Friday afternoon several coach loads visited some of the old mansions and landmarks of Portsmouth, some of the party extending their visit to the Navy Yard.

In the evening after the business sessions were completed, the large music room in which the meetings were held was cleared and the floor was soon again filled with members who kept up the social festivities in the way of dancing and music, both vocal and instrumental, until after midnight.

The first session was held in the evening of Sept. 15. After the meeting had been called to order, Secretary Woodbury read letters from Secretary of the Navy von L. Meyer, Senator Aldrich and Charles T. Plunkett, former president of the Association, who expressed regret at their inability to be present. Mayor Edward H. Adams, of Portland, then delivered a felicitous address of welcome in which he gave the visitors an interesting sketch of the city. In the absence of Vice-President George Otis Draper, the response to Mayor Adams' address was made by Edward Farnham Greene.

President Franklin W. Hobbs then delivered his annual address, which was received with marked approval and later called forth many compliments in private conversation. In addition to the business-like address President Hobbs distinguished himself as a presiding officer, dispatching the business with courtesy and skill.

President's Address.

FRANKLIN W. HOBBS, Brookline, Mass.

The cotton manufacturing industry has been in troublous times since we met in April last. High prices for raw material and high rates of wages have been the situation on the one hand, and low prices for our manufactured products on the other. The manufacturer has found himself between the "upper and nether millstones." Curtailment and shut-downs have resulted and the condition of the whole trade has been very unsatisfactory and disturbing. It is very evident that the prices for our products must advance and the buyers will have to pay more for them.

While the cotton crop is still uncertain and anyone would be rash to predict, yet materially cheaper cotton seems unlikely and the only natural solution of the present unfortunate situation will be a gradual advance in the prices of the products until the manufacturers can make a fair return on the capital invested in business. This process of readjustment is now taking place and already there is a slight improvement in both demand and price for some goods and it will undoubtedly in time extend throughout all lines.

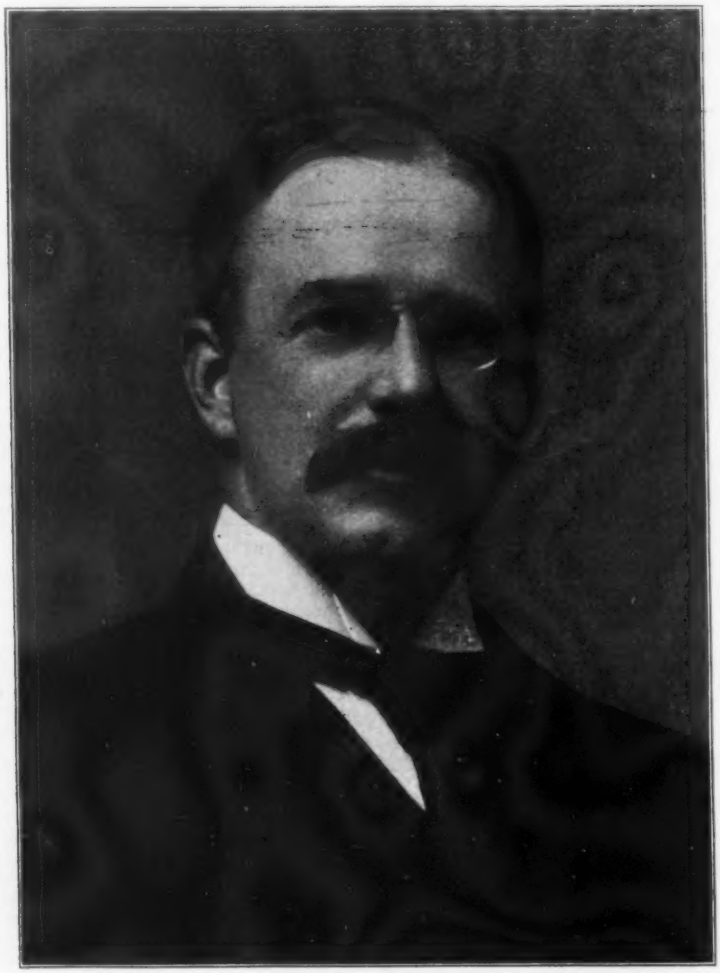
We have only to look back one short year to find every spindle running, labor well employed and well paid and capital earning a fair return. Times like the present are certainly trying and vexatious but should not discourage us or deter us from carrying forward the work of our industry. Rather let us learn from such experiences, as we have in the past, lessons of economy, of increased efficiency and higher standards of perfection.

You are all familiar with that line of Longfellow, "Behind the cloud is the sun still shining." Just as certainly behind the present cloud of depression is shining the sun of good times ahead of us, and we must be prepared for a period of renewed activity and look forward to a period of greater prosperity than we have ever known.

HANDLING OF COTTON.

The meetings of this Association, ever since its foundation over fifty years ago, have abounded with criticisms upon the packing, handling and merchandizing of cotton, which, nevertheless, I

regret to state have remained in practically the same condition. These economic evils have been fully recognized and numerous meritorious plans have been suggested to remedy them, but they were not accompanied by sufficient financial resources necessary for such a gigantic movement as the economizing of the American cotton crop. It is therefore but natural that careful attention should be given to the recent proposition to establish bonded warehouses in cotton raising districts and perhaps also at cotton manufacturing centers for the storage of the cotton crop. The fundamental portion of the proposition, as far as it has been given to the public, provides that the warehouse certificates in addition to agreeing to deliver identical bales of cotton of specified grade and staple represented by these receipts, should be secured by insurance on the cotton and bonds upon the warehouse keeper and also by an ample guarantee fund in the hands of trustees so that the cash indemnity in case of failure to deliver the specified cotton should be promptly made. It is stated that arrangements for underwriting the large capital necessary for this enterprise for the conversion of the American cotton crop from a fixed asset into personal property are in an advanced state of progress by financiers. European bankers as well as those in this country have stated their readiness to accept such certificates as collateral security for loans, and this negotiability would naturally extend to every American bank which had the opportunity to make advances on such security.



FRANKLIN W. HOBBS, PRESIDENT OF THE NATIONAL ASSOCIATION OF COTTON MANUFACTURERS.

The result of such liquefaction of the American

cotton crop would be far-reaching in its advantages, beginning with the planter or merchant first owning bales upon which he could obtain advances at lower rates than is possible under present conditions and yet allow him to pay his notes and to dispose of his interest in the equity by ordering a sale of this collateral whenever the market was satisfactory. By distributing the movement of the crop over months where weeks are now required, it would relieve the congestion of transportation companies and remove the cause of many existing errors in the handling of such merchandise.

The guarantee would be expected to abate the difficulties which infest the deliveries of cotton, and the absence of forced sales through the present inadequate storage facilities would be a powerful factor in reducing fluctuations in the price of cotton. Adequate storage of cotton means a corresponding diminution of the damage resulting from present methods of exposure to wet and dirt. Such systematized storage would be expected to have a material influence in the better ginning and baling of American cotton, reaching to material advantages upon the staple and tare.

However extensive may be the financial resources engaged in the enterprise, it will require time, skill and patience to overcome the inertia developed by generations of cotton growers who follow the footsteps of their ancestors, but this can be stimulated if it is conducted in such a manner that the initial owners of baled cotton can reap their share of the known possible economies in merchandizing cotton which are practically unavailable under present commercial conditions.

This proposition embodies a radical difference from many of the large commercial movements of the day, because in place of being subject to the allegation that it is in restraint of trade, it is clearly a method for facilitating commerce and as such will be advantageous to both the producer and the consumer of this valuable staple.

This proposition if wisely developed, with adequate capital, on the lines informally set forth by those directly interested in the matter, will be worth the careful attention of every manufacturer of American grown cotton.

COTTON BUYING.

At the present time the average buyer places his orders for a given number of bales of cotton, and not pounds. This Association and others have gone on record in favor of buying on a pound basis, but "it is a custom more honored in the breach than the observance," and now one never knows the amount of cotton to be received. On an order for 100 bales, it may vary from 30,000 to 60,000 pounds and yet constitute a good delivery on an order for 100 bales. Is it not time for us to insist that 100 bales of cotton shall mean 50,000 pounds of cotton, and to so specify in our contract and insist on delivery within 1 per cent. of the weight specified? Thus we would make the weight rather than the number of bales the real basis. When we sell 50,000 pounds of yarn we are expected to deliver that amount—why not buy our cotton in a similar way?

The question of tare is also one on which we can agree, and insist on a uniform allowance. The Arkwright Club has repeatedly voted to establish 22 pounds as the limit on every bale a basis for tare, and yet some buyers continue to allow 24 pounds.

On some questions of general policy we may not all agree, but surely both of the above are matters on which united action can be had and about which there ought not to be any difference of opinion. In order to accomplish results, however, we must do more than pass resolutions; we must carry out the spirit of the resolution in our actions.

MOISTURE IN COTTON.

At the International Cotton Congress held in Brussels in June of this year, the following resolution regarding moisture in cotton was passed:

"That this Congress requests the various affiliated associations to establish testing rooms in their respective countries by which trustworthy scientific tests of internal damp in cotton may be made, such testing houses to deliver an official certificate showing in percentage the amount of damp contained in the cotton tested."

This matter received the careful consideration of a special committee of the Association on "Moisture in Baled Cotton," of which one of our ex-presidents, Mr. William D. Hartshorne, was a member, and which committee presented an interesting and thorough report at the meeting of the Association held in Boston in April, 1907. This is an important subject, and one which, unfortunately, has received little attention by the trade in general in this country. The practical importance of the matter may be seen by the statement that at present prices for cotton a variation of 1 per cent. in the amount of moisture means, in round numbers, $4,000 per year to a mill using 100 bales of American cotton per week. The actual amount of moisture in different lots of cotton will, of course, vary very much, owing to the great variations in climatic conditions in different parts of the country. The actual amount of moisture, however, has no reference to the establishment of a standard amount of regain, on which the standard weights should be figured. In some countries it is already the custom to figure a regain of 8 1/2 per cent. in cotton yarns; that is to say, samples of yarn are heated until they no longer lose weight, and then to that dry weight 8 1/2 per cent. is arbitrarily added to allow for a proper amount of moisture, and the amount then obtained is that used in invoicing the yarn. Under this system everyone buys or sells the same amount of moisture and it is perfectly fair to all parties concerned.

Worsted tops and worsted yarns are sold on the basis of a definite regain in England and in France, and tops are now sold on the basis of a definite regain in this country.

It is claimed that in many cases cotton is received with as much as 15 per cent. moisture in it, and the variations in amount are certainly great, much more than is realized by the average buyer. It will, of course, be a difficult matter to bring the trade to a point where some such system will be adopted, but it is none the less worthy of our most serious consideration, and it is sug-

gested that some further action be taken by the Association along these lines.

COTTON GROWING IN INDIA.

A determined effort has been made this summer to induce the British Government to appoint specialists and a trained staff of experts in each province in India to increase the production of cotton in that country. At a hearing given by Lord Morley in India Office on July 27, 1910, to a deputation from the International Cotton Federation, it was stated that:

"It was to India that all the cotton manufacturing countries of the world looked for the speediest relief from the shortage of raw material, and it must also be borne in mind that India came next in importance to the United States of America as a cotton-producing country. India produced nearly one-fifth of the cotton supply of the world, and although it was not suitable to any great extent for the English cotton industry, yet it would be an enormous relief if its cultivation could be so encouraged that both the quality was improved and the quantity largely increased. The development of India was of supreme importance to England. Forty per cent. of the products of the cotton manufacturers of Lancashire were exported to that great country."

C. J. H. WOODBURY, SECRETARY OF THE NATIONAL ASSOCIATION OF COTTON MANUFACTURERS.

Mr. Wadia, of Bombay, a member of the International Committee, said that "India might be made to produce a great deal more cotton than she did. Already her products were sent to England, to continental countries, to Japan, and even some of their cotton went to the United States of America."

It was claimed by the committee that with im-

proved agricultural methods the present acreage could yield ten million bales instead of four or five, and that it is possible for India to raise twenty million bales. It will be interesting to us all to watch the developments in that country along these lines, for, while we do not use much of this cotton, it is true that the more of it there is, the more American cotton will be available for other purposes.

BILLS OF LADING.

The use of a bill of lading in connection with loans has become so common and so necessary as a means of financing the great crops of the country that any attempt to restrict its use or discredit it in any way is a most serious matter. Certain foreign bankers have questioned the cotton bills issued by some of our railroads, but a plan has been practically agreed upon, which it is hoped will satisfy the foreign money lenders and provide all the necessary safeguards and at the same time not be unreasonable for the railroads. The Southern railroads are considering an agreement by which validation certificates are to be attached to order notify bills of lading, and the railroad in each case will certify that the agent signing the bill is the company's regular agent at the point of which shipment is made, and as such is authorized to sign bills of lading in accordance with the regulations of the company and that the signature on the bill is the agent's signature. Other precautions are proposed against fraud or irregularity, and it is believed the issuance of this class of bill of lading will restore the credit of the bill of lading and give all reasonable safeguards.

The above has reference only to bills of lading for foreign shipments. The domestic uniform bill of lading was passed the House of Representatives at the last session of Congress and it is believed it will pass the Senate at the next session. In the meantime, state laws in the various southern states are being enacted, making the carriers responsible for bills of lading signed by their agents where they have not received the goods.

WAGES IN COTTON TRADE IN ENGLAND.

As a matter of general interest, it is well to note that on July 15, 1910, in Manchester, Eng., at a joint meeting of the master spinners and operatives, a settlement of the wage question was reached, and an agreement made which is to continue in force for the next five years, during which time no demand either for an advance or reduction in present wages shall be made. This agreement affects 50,000,000 spindles and 160,000 operatives, and will certainly tend to prevent the constant unsettlement of trade which has resulted from the repeated applications for advances or reductions in wages.

TAXATION OF MILL PROPERTY.

Massachusetts has been considering the reform of its taxation laws and commissions have investigated the subject for years without real results. Massachusetts depends for its very existence almost on its manufacturing industries, yet the burdens of taxation on those industries are heavier than in any other state.

Machines which give work to thousands of people, that turn out a vast product and add to the wealth of the community are taxed for approximately their original cost. In 18 states either part or all of their manufacturing plants are exempt from taxation. In Lowell, out of a total assessment of $15,000,000 on personal property, $8,000,000 is on productive machinery. In Lawrence machinery pays over 45 per cent. of the total tax on personal property.

Municipal assessors have ignored the full extent of the depreciation of buildings and machinery not merely that resulting from wear and tear, but more especially that due to depreciation by subsequent invention, and mills have been forced into long and expensive litigation before their rights as tax payers could be maintained by the courts. The questions involved in this litigation over the taxation of mill property have been the subject of several valuable papers before this Association which are well worth the consideration of manufacturers having similar difficulties, for they show the lines of appraisal which have been established by the Supreme Court of Massachusetts. Depreciation extends beyond machinery and buildings, as is indicated by the report of a member of this Association, acting as referee in a certain mill tax case in which he ruled that the mill site had so depreciated as a result of methods of electrical transmission of power, that if the present mill was impaired for manufacturing purposes by fire or otherwise, another mill would not be built on that site, but that the power of the water privilege would be transmitted by electricity to a new mill at some place convenient for railway transportation.

Several commissions have urged the lightening of the tax on our manufacturing industries and when the subject comes up again in Massachusetts, or any other state, we should see to it that the subject of the taxation of mill property receives the careful consideration it deserves.

THE ASSOCIATION.

The successful existence of this Association for fifty-six years makes it probably the oldest technical organization in this country which has maintained, without a lapse, semi-annual meetings during the whole period of its existence, and it is by far the oldest association of manufacturers.

This continued affiliation of those who have constituted its membership for nearly two generations has established a permanency which is of itself an indication of its usefulness to the many interests of these people. Only two survivors of the charter members of the New England Cotton Manufacturers' Association remain, and both of these, in their mature years, still cherish through this channel the remembrance of more active days.

The constant effort of this Association for the improvement of the industry has undoubtedly been a strong factor in the wonderful development of the American cotton manufacture during this period, both in suggestion of improvements and also in their introduction, while the friendships acquired by the members at the meetings have been of inestimable value and have established those

fundamental pleasures of life derived from co-operative relations between men.

The work of the Association is a matter of open record in its transactions, yet beyond that, as time goes on it is becoming a power of ever greater advantage to the industry, as is warranted by its broadly representative membership.

Although this Association has had such a long and honorable career the numerous changes introduced from time to time show that it is progressive and imbued with that "divine discontent" which is essential for advancement. The Association "looks up, not down; forward, not back."

In addition to the many broadening changes developed from time to time as opportunity served, there have been many more, fully prepared and forced to lie in abeyance through the lack of resources necessary for their fulfilment. The Association was formed, in the words af its charter, "for the purpose of encouraging scientific investigation and experiment as to methods of manufacturing cotton; collecting and imparting information relating to this industry, promoting social intercourse among its members, and establishing and maintaining a library of works on textiles." Have we carried on those aims and objects in as vigorous and complete a manner as their importance to the industry warranted?

It is indeed true that practically all of the papers are based upon the results of investigations by private enterprise and at enormous cost, and such will undoubtedly continue to be the case in the future. There are other available lines of work, particularly that of committees who give of valuable time and long experience, of which we have had such a noted instance during the last two years in the committee on standard specifications, which has been publicly termed by a leading merchant of great experience "as the most valuable work ever undertaken by this Association," the expenses for which it was actually necessary should be met by private subscription, as has been the case in two earlier instances.

At the last meeting, the president of the Massachusetts Institute of Technology offered the use of the splendid laboratory equipment and the services of the staff of that institution to this Association at the mere cost of the work, and yet, under existing conditions, the committee appointed on the subject will be unable to make a conclusive report for lack of funds available to execute any recommendations which they may see fit to make.

While such original work may be beset with many failures, yet the experiences of the commercial laboratories in the great industries of electric light, transmission of power, railroads and the manufacture of steel show the possible value of such work.

For a concrete example in the province of this Association, you will remember that a number of years ago a corporation gave through a member at a meeting the results of investigations costing less than $1,000, and its president afterward showed that it had saved to the industries represented by this Association over $100,000 a year, and whatever may have been the advantage of his corporation, he confessed a full satisfaction as to the results.

Comparison has been made between this organization and other technical societies, because it is believed to be the only one holding two meetings a year and issuing illustrated transactions, whose dues are not at least twice that of this Association, and these organizations also have an income from advertisements.

It is to the help from this latter source that The National Association of Cotton Manufacturers has been able to continue on its present basis for many years, for the amount expended for the benefit of the members has been put over 40 per cent. greater than the dues.

Is it not our duty to most carefully consider the question of increasing the income that we may better carry on the purposes of the Association?

No change in the history of this Association was ever more fitting than the introduction of the recreative element in the fall meetings in a place like this "whose beauty passes description," where without any disparagement of the more serious questions which are to be considered, we can avail ourselves of the facilities for enjoyment sufficiently numerous to comply with the tastes of each one, and above that renew old friendships and make new acquaintances, and then go back to our work again with renewed vigor, for as Carlyle said in Past and Present, "All work, even cotton-spinning, is noble; work is alone noble."

The Friday morning session began with a very interesting paper on California cotton by Joseph R. Loftus, of Los Angeles, Cal. An article by W. H. Kindig, of El Centro, Cal., which was published in our August issue, gave an account of Imperial Valley cotton and covered practically the same ground as that covered by Mr. Loftus. The reading of the paper was followed by a general discussion.

Edwin H. Marble—It is said throughout the South that cotton cannot be grown where there is no frost.

Mr. Loftus—We have looked into that question and found it to be valueless in the Valley. Along in December we have some frost. The people of the South say that frost is necessary to produce a proper opening of the boll, but they do not want frost very early. We begin picking along in September. We have to be sure not to continue irrigating during the whole winter, otherwise the cotton will keep on growing. We stop irrigating in August, September or October, and as soon as we shut off the water, the plants stop growing and begin to open. This year we began picking on August 4.

Thomas J. Clexton—I want to say a word in regard to that theory myself for I am from the South. We need the frost where the disease is. If you have less frost and less disease in your cotton you do not need the frosts. If we do not have the frost we cannot overcome the disease in our cotton.

Prof. R. J. H. DeLoach—Have you ever found any disease?

Mr. Loftus—We have noticed the bolls becoming brown and soft and we concluded that it was the result of putting on too much water. We have occasionally found a little worm getting into the boll, but it has done no harm to speak of. We do not feel that there is much opportunity for insects to get the start of us because we keep careful watch of those things. We had the St. Mary's scale scare a year or two ago and spent about $150,000 getting ready for it and it never came.

Henry G. Lord—How is the cotton baled?

Mr. Loftus—Last year we used burlap and wire tie and got a tare of about fourteen pounds. This year we do not feel that we have money enough to put in a gin compress, so that we are not going to compress our bales in California. Our arrangements with the railroads allow us to compress at Texas and get the same rates. We are obliged to use some bagging and we get 28 pounds tare on that. We feel that next year we can put in a Memphis gin compress, of which you have heard. The compress men of the South have been very kind to us and have told us some things that we were not anxious to learn. We want to sell our cotton in a proper way. We want to make money out of growing and handling cotton legitimately.

James R. MacColl—There is no subject more interesting than the supply of raw material. The world needs more cotton than the planters can supply. A large part of the time is spent discussing the question where shall we get good cotton? The most promising field today is in India. The business there is growing until within a few years the crop will amount to eight or ten million bales. We certainly welcome any new development in this country such as Mr. Loftus has shown. I tried to impress on him yesterday the importance of having the cotton well baled and branded. This I think will be a great source of profit to a new comer, if the cotton is put out in an entirely different manner than it has been in the South. If cotton were marked with a certain brand we might know each brand and would be ready to pay better for the carefully handled and ginned bale. I hope he will not send the cotton to Texas to be baled there, but will get a compress and do the work at home and get a mark on his cotton so we shall know it and be glad to buy it.

Mr. Loftus—The difference in the rate between the compressed and uncompressed cotton is 25 cents a hundred and the spinners who use this cotton prefer to have it shipped and pay the extra 25 cents.

Before beginning his address, Prof. DeLoach read a telegram from the mayor of his home city, Athens, Ga., extending to the Association a most cordial invitation to hold its next session in that city.

There was considerable discussion of Dr. Moore's paper, particularly in regard to recognized standards of allowance of moisture in cotton. Dr. Moore was questioned as to whether his regain standard for cotton of 8 1/2 per cent. had ever been accepted officially by any of the associations in the United States. He said he was not aware that it had been accepted, although it was recognized by those who had given the matter study. Mr. Hartshorne of the Arlington Mills spoke of his experience gained in his research into this subject. Probably no man in this country has gone into this subject deeper than Mr. Hartshorne, both for cotton and for worsted. He explained that not only was variation due to atmospheric conditions but also with different lots of cotton, some of which varied so much as to suggest artificial dampening. In this connection President Hobbs read a letter received that morning from a member, calling attention to an article which appeared in the August issue of the Textile World Record, describing cotton growing in India, in which Arnold Schmidt, secretary of the International Federation of Cotton Spinners and Manufacturers, stated that in the central provinces there was only one cotton gin that did not artificially dampen the cotton. No secret was made of this dampening and special rates are quoted for dry and wet packing.

It was announced that the paper on "Rewinding of Weft Yarn" which was down on the program to be read by F. H. Bishop of Boston would be postponed until the spring meeting.

In the absence of Chairman Albert F. Bemis, Edwin Farnham Greene, a member of the committee on Standard Specifications, reported their final conclusions on the cotton sales note for piece goods. Mr. Greene answered a number of questions asked by members relative to some of the features of the sales note.

Committee on Standard Specifications.

FIFTH REPORT.

To the President of the National Association of Cotton Manufacturers:

As indicated in the report of this committee at the April meeting, a joint committee representing various interests,—buyers, converters, selling agents and manufacturers,—has been at work revising the proposed salenote for staple gray goods to make it acceptable to the great majority of those who would be affected by it. On July 7, 1910, a meeting of this joint committee was held in New York city and a form slightly differing from the one proposed by us and adopted by this Association a year ago was approved and accepted

for trial use. A copy of this form is attached to this report.

The salenote your committee tenders as its completed work on this particular subject and asks for the Association's formal approval of it. At the joint meeting in New York referred to above, arrangements were made for introducing the salenote for trial use just as soon as an opportune time should arrive, and, following your approval of it and that of the American Cotton Manufacturers' Association, the salenote should go into practical use within a few weeks.

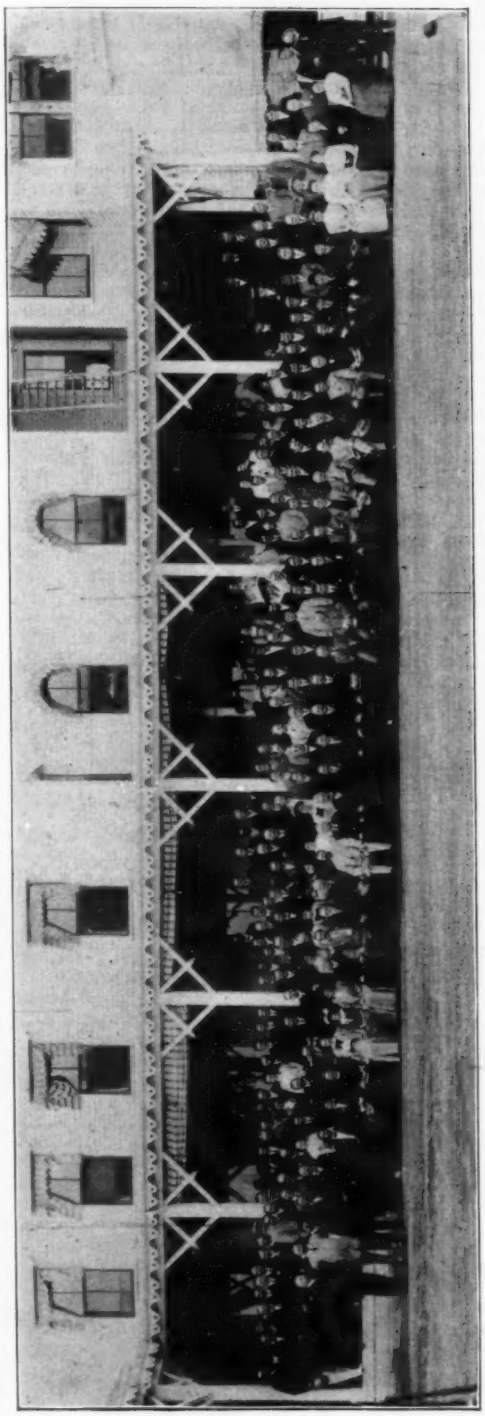
At a future meeting it might be of interest to consider scientifically some of the points involved in the salenote, but at this time we will simply call your attention to changes in the substance of the salenote that have been made during the past year.

On the face of the salenote under the word "Quantity" an opportunity has been given to specify allowable variations in length of pieces, if anything different from what is customary in this respect is desired in the case of any given contract. A standard variation to define the custom on this point was seriously considered by the joint committee in New York and favored by a number of buyers, but the ideas on this subject were so varied that it was not feasible to harmonize them and, therefore, definite action on this matter was left for the future, if the revision now made to cover the case does not prove adequate.

Under "Time of Delivery" it was concluded useless to complicate the matter by allowing a leeway of two days before or after the time specified, inasmuch as the time of delivery specified on the salenote should be so worded as to include all the latitude required.

In the treatment of "Weight" perhaps the greatest change of all has been made. The New York joint committee gave considerable attention to this subject and decided upon what we believe to be a very sane and flexible treatment of the matter. It is assumed that in coarse goods the weight of any shipment should not average lighter than that specified, and in the case of very fine goods that it should not be heavier. The form is made up therefore, in such a way as to limit the weight of goods in any given case only on one side, thus making it practicable for any mill to come within the specifications. This conforms closely with the wording of present salenotes and with the custom on weight. It is recognized that bale weights will vary somewhat from the average of a shipment, and that piece weights will vary somewhat from the average of a bale. This matter has been made the cause of considerable inquiry and it has been found that an allowable variation of one per cent. in bale weights from the average of a shipment and three per cent. in piece weights is ample to cover this matter. Furthermore, the limiting of weight variations in the bale and piece will insure uniformity of product. It was deemed clearer and better to make this change in "Weight" on the face of the salenote than in "allowable variations" on the back.

It was found difficult to harmonize the views of buyers and manufacturers in regard to the free storage of goods held for shipping instructions and, in consequence, paragraph II on the back



MEMBERS AND GUESTS AT THE MEETING OF THE NATIONAL ASSOCIATION OF COTTON MANUFACTURERS.

was changed to correspond closely with present practice, yet, at the same time, clearly specifying that such goods shall be at buyer's risk.

Under "Rejection and Claims" it was deemed necessary to give the buyer more time for rejection, and, consequently, by the new form he is given five days within which to notify the seller of rejection in case of delay in delivery, and ninety days after receipt of goods within which to reject them, if found substantially wrong. It was thought best to include in the contract a statement of the right which every buyer has under the common law of cancelling or replacing at the seller's expense any goods that are delayed.

Slight changes have also been made in the "Allowable Variation." Under "Width," in order to insure full measurements, the buyers insisted upon specifying that in the majority of places in each piece the width should be equal to or greater than the stipulated width. This same principle has also been applied to warp and filling count. Otherwise no essential changes have been made.

We believe in the present form our proposed salenote is thoroughly practical in every respect, and we are convinced that if members of this Association and others interested will use it, or give it a thorough trial, the standard of goods delivered will be higher, and the buying and selling of goods effected with less friction, and with a clearer understanding of the rights and intentions of buyer and seller than heretofore. We ask you all in whatever way you can to back up the work of this committee by fostering the use of this salenote.

Our sub-committee on yarn has nothing to report at this meeting. Tests are still being made and data collected, but pending the successful outcome of the salenote on cloth, work has been deferred on a salenote for yarn. Perhaps at the next meeting something on this matter will be forthcoming.

Respectiully submitted,

Albert F. Bemis, Chr., Pres. Bemis Bro. Bag Co.
Frederick A. Flather, Sec'y, Treas. Boott Mills.
Daniel M. Bates, Ass't Supt., Joseph Bancroft & Sons Co.
Arthur T. Bradlee, of William Whitman & Co.
S. Parker Bremer, of Parker, Wilder & Co.
Philip Dana, Supt. Dana Warp Mills.
John Eccles, Agent, Ponemah Mills.
Edwin Farnham Greene, Treasurer, Pacific Mills.
William B. Hawes, of O. S. Hawes & Brother.
George H. Hills, Treasurer, Davol Mills.
Frederick B. Macy, Treasurer, Soule Mills.
James R. MacColl, Treasurer, Lorraine Mfg. Co.
Lewis W. Parker, President, Olympia Cotton Mills.

CONTRACT SALE NOTE FOR STAPLE GRAY GOODS.

Number .....
Sold for Account of .....
To .....
Quantity
Allowable variation in length of pieces if special.
.....yards (variation not to exceed 2 per cent. allowed)
.....pieces of.....yards each
.....bales of.....yards each
In addition, buyer to take and seller to deliver if made: ..% Seconds at....; ..% Tailings at stated contract price if contract is not renewed.
Quality
Time of Delivery.....from date hereof.....
.....during each week, commencing week ending....
.....during each month, beginning in the month of....
Width in Inches
Count per Inch.....Warp.....Filling.....
Weight.....**Yards to the Pound.**
No shipment to average lighter (heavier) than..
No bale to be over 1% lighter (heavier) than....
No piece to be over 3% lighter (heavier) than...
Price.....**Cents per Yard.**
Terms of Payment:
Net....days from date of delivery.
Net....days from date of delivery less..% for payment within....days from date of delivery.
Place of Delivery:
F. O. B. to carrier at.....with.....freight allowance.
F. O. B.
Special Conditions:
Shipping Instructions:
If the production of the seller shall be curtailed during the time above named, by strikes, lockouts, or unavoidable casualties, the deliveries shall be made and accepted in proportion to the production.

The provisions of paragraphs I, II and III, and the allowable variations from specifications as adopted by The American Cotton Manufacturers' Association and The National Association of Cotton Manufacturers, all as printed on the back hereof, are accepted and agreed to as part of this contract, unless otherwise stated herein.

This sale note is the entire contract between the buyer and seller, and any alteration in or changes from the printed form of this contract must appear on it in writing.

To .....
(Signed) .....
————Reverse————

Paragraph I.—**Passing of Title on Delivery.** Unless otherwise specified, the title to goods sold passes to the buyer (subject to the right of stoppage in transitu):—

a.—Upon delivery F. O. B. to carrier, consigned to buyer, and thereafter goods are at buyer's risk.

b.—Upon arrival of goods at destination and delivery to buyer of bill of lading or of goods, in the case of goods to be delivered F. O. B. elsewhere than to carrier.

c.—Upon delivery of indorsed bill of lading or of goods in the case of goods consigned to seller's order.

d.—Upon the separation of the goods and holding subject to buyer's order (the invoice to follow by due course of mail), in the case of goods to be held or if buyer fails to give shipping instructions.

Paragraph II.—**Storage and Insurance.** Goods invoiced and held subject to buyer's orders shall be at buyer's risk, but covered by fire insurance effected by sellers in reputable companies.

Paragraph III.—**Rejections and Claims.** The buyer cannot reject the goods for delay in delivery unless he notifies the seller within five business days from receipt of bill of lading, or of invoice if goods are to be held. When contract calls for de-

livery in instalments, the buyer cannot cancel the contract for any default in any one or more instalments not amounting to a substantial breach of contract, but may cancel or replace at seller's expense any delivery that is delayed.

Buyer cannot reject goods for defects in quality or other like defaults (a) if he cuts or converts them, nor (b) unless he notifies seller within ninety days from receipt by him or at finishing works of goods not held, or within ninety days after date of invoice if goods are invoiced and held; nor (c) unless such defects amount to a substantial breach of contract.

Loss of right to reject does not deprive the buyer of his right to claim damages, if any; but no recovery shall be had on any claim not made within one year from receipt of goods or from date of invoice if goods are held.

ALLOWABLE VARIATIONS FROM CONTRACT SPECIFICATIONS.

Width. The width shall not vary anywhere by more than 3/8 of an inch below the stipulated width, nor more than 5/8 of an inch above. The width shall not be uniformly less than the stipulated width, but must, in a majority of places in each piece, be equal to, or greater than, the stipulated width. Goods shall be measured at right angles to the selvages when laid open on a flat, horizontal surface and smoothed out by hand, but not stretched.

Warp Count. Except within four inches of each selvage (where exclusive of the selvage, the count must approximate that stipulated), the number of warp threads per inch shall not vary anywhere by more than one thread per inch below the stipulated count, nor by more than two threads per inch above. The number of threads in each piece must equal the stipulated count multiplied by the stipulated width plus the extra threads used in the selvage.

Filling Count. The number of threads in the filling, or weft, shall not vary anywhere by more than three threads per inch below the stipulated count, nor by more than four above. In the case of sateens, when the count of filling exceeds the count of the warp, the allowance for variation above specified shall be increased by the same percentage that the filling count exceeds that of the warp count. In any case including sateens, the filling count per inch shall not run below the stipulated count throughout the piece, but must, in a majority of places in each piece, equal or be more than, the stipulated count.

Weight. In case of controversy regarding the weight of goods, decision shall be based on goods which have been exposed for twenty-four hours to normal atmospheric conditions approximating a temperature of 70° F. and a humidity of 70 per cent.

Dr. N. A. Cobb, of the Bureau of Plant Industry, Department of Agriculture, next gave an interesting account of the work done by the Government to establish standards for raw cotton. We have watched the progress of this important work ever since it was undertaken by the Bureau of Plant Industry, and can testify to the thoroughness, patience and scientific accuracy with which it has been conducted. Dr. Cobb has combined science with industry in this undertaking in a way that might well be taken as a model by other departments of the government engaged in similar work. We were so strongly impressed with the high character of this work that we had Charles Richards Dodge, the well known fiber expert, make a study of the subject at Washington, and his illustrated report was published in our June issue.

A very pleasant feature of the session on Saturday was the resolutions reported by William D. Hartshorne congratulating Mr. and Mrs. M. F. Foster on the recent celebration of the 50th anniversary of their marriage on Sept. 13, 1860. Mr. Hartshorne stated that Mr. Foster became a member of the Association on April 17, 1872, and had probably attended a greater number of meetings than any other member. A resolution was adopted by a rising vote that the greetings and congratulations of the Association be extended to Mr. and Mrs. Foster.

Following is a list of the new members elected at this session:

FOR ACTIVE MEMBERSHIP.

Clinton S. Andem, Agt. Grosvenor-Dale Co., North Grosvenor-Dale, Conn.

D. Y. Cooper, Prest. Harriett Cotton Mills, Henderson, N. C.

John T. Dawson, Mgr. American Thread Co., Kerr Mills, Fall River, Mass.

James F. Dorsey, Sales Mgr. Hamilton Mfg. Co., 93 Franklin St., Boston, Mass.

Frederick W. Easton, Prest. Waypoyset Mill, Central Falls, R. I.

George William Feltham, Oxford Linen Mills, North Brookfield, Mass.

George Lincoln Forrest, Prest. Eastbrook Co., Gardner, Mass.

Victor E. Freeman, Vice-Prest. and Gen. Mgr. Superior Thread and Yarn Co., 17th St. and 4th Ave., New York City.

Arthur T. Hopkins, Supt. Boston Woven Hose and Rubber Co., P. O. Box 5077, Boston, Mass.

William Henry Kinkead, Oxford Linen Mills, North Brookfield, Mass.

Edwin V. Livesey, Supt. Heywood Narrow Fabric Co., Fall River, Mass.

Vene Luigi, Directeur de la Filature Curati, Pinerolo, Italy.

Nicholas J. Malachowski, Ph. D., Sec'y to the Cotton Committee of St. Petersburg, Russia.

Frederick H. McDevitt, Supt. Maverick Mills, East Boston, Mass.

Dr. Russell W. Moore, Mgr. The United States Conditioning and Testing Co., New York City.

Walter T. Phipps, Sec'y American Silk Spinning Co., Providence, R. I.

Robert A. S. Reoch, Supt. Cocheco Print Works, Pacific Mills, Dover, N. H.
Arthur E. Robbins, Treas. Corr Mfg. Co., Taunton, Mass.
Lee Rodman, Vice-Prest. Indiana Cotton Mills, Cannelton, Ind.

FOR ASSOCIATE MEMBERSHIP.

Luther C. Baldwin, U. S. Bobbin and Shuttle Co., Providence, R. I.
John Sturgis Codman, National Electric Lamp Asso., and Holophane Co., 93 Broad St., Boston, Mass.
G. Scott Dalgleish, Cotton Planter, Cairo, Egypt.
William M. Davis, 93 Broad St., Boston, Mass.
J. R. Fordyce, Prest. Thomas-Fordyce Mfg. Co., 2115 Broadway, Little Rock, Ark.
George Willmarth Foster, Lowell Machine Shop, 35 Nicollet St., Lowell, Mass.
J. Fred Havey, Selling Agt. Lowell Machine Shop, Lowell, Mass.
Churchill Hungerford, Prest. Hungerford & Terry, Inc., 1414 Pennsylvania Bldg., Philadelphia, Pa.
Joseph R. Loftus, Prest. Joseph R. Loftus Co., El Centro, Cal.
Harold Lomas, District Mgr. Crocker, Wheeler Co., 636 Equitable Bldg., Baltimore, Md.
William Muir, Providence, R. I.
George F. Steele, Dist. Mgr. Power and Mining Dept., General Electric Co., 84 State St., Boston, Mass.
Spencer Janney Steinmetz, 141 Milk St., Boston, Mass.
Godfrey M. S. Tait, Prest. Tait Producer Co., 90 West St., New York City.
Frederick D. Willey, S. A. Felton & Sons Co., 921 Union St., Manchester, N. H.

A list of members and guests present is as follows:

ALABAMA.

T. H. Rennie and Lois Rennie, Pell City.

CALIFORNIA.

J. W. Oakley, Los Angeles.
J. R. Loftus, Los Angeles.

CONNECTICUT.

Joseph Merriam, Middletown.
J. R. Montgomery and Spencer Montgomery, Windsor Locks.
A. R. Young and the Misses Mabel and Irene Young, Jewett City.
S. T. Butterworth, Baltic.
W. B. Knight, Willimantic.
L. B. Cranska, Plainfield.
H. C. Atwood, Mrs. H. C. Atwood and Clinton W. Atwood, Killingly.

GEORGIA.

R. J. H. DeLoach, Athens.

MAINE.

C. A. Wakefield, Biddeford.
Walter H. Bradley, Lewiston.
T. B. Stevenson, Augusta.
H. P. Garland and C. P. Garland, Saco.
F. A. Lord, Saco.

MARYLAND.

William G. Nichols, Baltimore.
Harold Lomas, Baltimore.

MASSACHUSETTS.

Franklin W. Hobbs, Boston.
G. W. Foster and Mrs. Foster, Lowell.
F. B. Kenney and Mrs. Kenney, Lowell.
F. S. Klebart, Boston.
J. A. Knight, New Bedford.
Leonard C. Lapham, New Bedford.
S. R. Latshaw, Boston.
H. Williams, Ipswich.
Spencer J. Steinmetz, Boston.
Anold B. Sanford, 2d, Taunton.
F. M. Scantlebury, Boston.
A. K. Searles and Mrs. Searles, Northbridge.
Charles A. Bowen and Mrs. Bowen, New Bedford.
William B. Hayes, Boston.
L. G. Goodrich, Boston.
A. B. Marble, Boston.
William Firth, Boston.
P. B. Sanford and Mrs. Sanford, Taunton.
John A. Collins and Mrs. Collins, Fall River.
M. L. Comey, Easthampton.
J. A. Cooper and Mrs. Cooper, Whitinsville.
Leonard W. Cronkhite, Boston.
A. J. Currier, New Bedford.
S. S. Dale, Boston.
D. J. Danker, Boston.
Frank L. Nagle and Mrs. Nagle, Boston.
John H. Nelson and Mrs. Nelson, Lynn.
F. L. Babcock, Boston.
J. F. Bannon and W. H. Bannon, Mansfield.
R. N. C. Barnes and Mrs. Barnes, Boston.
Chas. F. Libby and Mrs. Libby, Lowell.
Mrs. Robert Marshall, Fall River.
Robert Burgess, Boston.
Robert Bishop, Boston.
Col. P. H. Corr, Taunton.
T. J. Claxton, Boston.
George P. Grant, Jr., Fitchburg.
A. H. Green, Lowell.
Joseph B. Jamieson, Boston.
George K. Jenks, Boston.
Mitchell Johnson, Boston.
T. Ellis Ramsdell, Housatonic.
W. J. Holden, Boston.
Mrs. Miriam H. Bennick, Methuen.
Charles E. Blair, Boston.
William J. Boardman, Boston.
Dr. Richard Delaney, Winthrop.
Miss Grace L. Durgin, Wollaston.
Charles W. Hawkes, Boston.
Wm. E. Hall and Mrs. Hall, Lowell.
H C. Perham and Mrs. Perham, Lowell.
F. T. Walsh and Mrs. Walsh, Boston.
E. W. Thomas and Mrs. Thomas, Lowell.
Fred Lacey and Mrs. Lacey, Lowell.
John A. Collins, Jr., Lawrence.
Edwin F. Greene, Boston.
W. N. Goddard, Boston.
E. D. Hague, Boston.
Alfred H. Hartley, Fall River.
W. D. Hartshone, Methuen.
Fred Havey and Mrs. Havey, Lowell.
A. P. Smith, New Bedford.
C. K. Cobb, Chestnut Hill.
R. B. Lowe, Fitchburg.
W. H. Coffin, Whitinsville.
F. E. Perry, Boston.
Walter T. Phipps, Newton.
G. E. Richardson, Boston.
A. E. Robbins and Mrs. Robbins, Taunton.

E. E. Palmer, Boston.
R. S. Parks, Fitchburg.
M. H. Merrill, Boston.
M. A. Metcalf, Winter Hill.
J. F. Monaghan, Waltham.
F. B. Macy and Mrs. Macy, New Bedford.
Fred E. Mann and Mrs. Mann, Boston.
E. H. Marble and Mrs. Marble, Worcester.
J. P. Marston, Boston.
F. H. Meek, East Douglas.
Bernard F. Merriam, South Framingham.
A. M. Chadwick, Lowell.
R. M. Macintosh, Boston.
Albert Walton, Boston.
G. B. Emmons, Lawrence.
H. G. Brinckerhoff and Mrs. Brinckerhoff, Boston.
T. F. Glennon and Mrs. Glennon, New Bedford.
Mr. and Mrs. Stephen C. Lowe and Philip C. Lowe, Boston.
L. E. Barnes, Methuen.
J. B. Bolton, Methuen.
A. S. Wattles and Mrs. Wattles, Canton.
R. E. Wattles, Canton.
William R. Noone, Boston.
Wm. M. Clark, Boston.
Gay D. Thayer, Worcester.
C. H. Clark, Mrs. Clark and Miss Clark, Boston.
A. C. Gardner and Wm. B. Gardner, New Bedford.
E. S. Willis, Fall River.
Bernard F. Merriam, South Framingham.
Henry G. Lord, Boston.
W. W. White and Mrs. White, Worcester.
H. S. Williams, North Adams.
C. J. H. Woodbury, Mrs. Woodbury and the Misses Alice P., Laura B. and Louise Woodbury, Lynn.
R. Redford, Boston.
E. Barnes, Boston.
Frederick A. Flather, Lowell.
W. M. Davis and Mrs. Davis, Boston.
Spencer J. Steinmetz, Boston.
W. I. Stimpson and Mrs. Stimpson, Hopedale.
Joseph Watters, Fall River.
J. W. Webster, New Bedford.
F. B. Comins, Boston.
L. T. Shurtleff and Mrs. Shurtleff, New Bedford.
C. P. Slocum, Boston.
Rufus A. Soule and Mrs. Soule, New Bedford.
G. F. Steele and Mrs. Steele, Boston.
N. F. Ayer, Boston.
John E. Rosenmeier, Boston.
F. A. Flather and Mrs. Flather, Lowell.
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WASHINGTON, D. C.

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Water Filtration as Applied to Textile Industries.

CHURCHILL HUNGERFORD, Pennsylvania Building, Philadelphia, Pa.

Twenty years ago few textile mills in the United States made any attempt to filter their water supply. Today there is hardly a bleachery or dyehouse in the country that has not installed some kind of an apparatus for the filtration of its water or at least is not seriously considering such an installation. The plans for all new factories include a filter.

There are two very good reasons for this remarkable change in attitude toward filtration. The first is that every manufacturer has to get the best results from the material employed and he cannot afford to turn out a good article that does not appear as well as an inferior one. The second reason is the gradual pollution of the streams of the country by sewage and industrial waste, and although appears to the boards of health and the various courts have been made time and time again the fact remains that our streams are growing very rapidly worse.

Various means of purifying our supplies have been attempted and are still being exploited. One inventor describes the merits of discharging electric currents through the water; another generates ozone in atmospheric air by means of high tension electrical discharges and then drives the ozonized air through the water; still another, by means of an electrolytic process, forms hydrate of alumina or hydrate of iron, which substances are supposed to be beneficial in the purification of the water. The last call in electrical treatment is the subjection of water to the violet and ultra-violet ray. However, by far the most satisfactory and most effective treatment has, up to the present time, been filtration, supplemented by whatever preliminary chemical treatment the conditions may require.

The first water filter of any consequence was constructed by an English engineer about 1847, for a small water works system in England. The quality of the filtered water was fair, but the capacity of the filter was only about three gallons per day for each square foot. This method of filtration has been developed and is now known as the slow sand method of filtration. The straining action of this filter is produced mainly by a layer of impurities, derived from the water itself, resting upon the sand bed through which the water is compelled to pass. When the layer of impurities becomes too nearly impervious it is necessary to withdraw the water and scrape the surface with shovels and hoes.

About 1883 or 1884 a Mr. Hyatt, of Newark, N. J., perfected a filter which gave good water, and could be operated at a rate of over one gallon per square foot per minute as against the three gallons per twenty-four hours of the slow sand filter, and which, when it became dirty, could be washed within its case by simply reversing the current of the water so that in an hour the filter was perfectly clean. This same inventor subsequently discovered that the use of alum in the filtration process greatly improved the appearance of the water so that the effluent was bright, clear and sparkling. This filter was the prototype of the mechanical filter as it is known today, and by the evolution of the principles involved in this filter we are enabled at the present time to construct a filter which gives perfect results when operating at the rate of five gallons per square foot per minute, makes the water crystal clear, absolutely colorless, entirely free from the coagulant used in the preliminary treatment, and one which will wash in from three to five minutes by reversing the current.

Thus, since the beginning of filtration in 1847, or sixty-three years ago, we have progressed from the slow sand filter which gave a rather dubious effluent when operating at the rate of three gallons per square foot per day, to the present mechanical filter which gives a perfect effluent when operating at the rate of 7,200 gallons per square foot per day. The original filter was merely a strainer, while the present apparatus is a device which removes not only the visible suspended matter, but also the coloring matter, various industrial wastes, many dissolved substances, and in fact almost anything that could make trouble or annoyance to the manufacturer. It is largely due to the stringent requirements of the textile bleacher and dyer that the filter has been brought to its present high state of efficiency.

Originally filters were constructed for the purpose of purifying drinking water. In recent years, however, it has been found in many instances that the standards which are adequate for drinking water are insufficient for many textile purposes, with the result that not only bacterial efficiency became a factor in the construction of filters, but also the ability to handle waters contaminated with industrial wastes, color, etc., and to effect this without leaving any trace of the chemicals used in the treatment given the water before filtration.

Let us describe an ideal modern filter plant and its method of operation. Generally outlined this plant would consist of a sedimentation basin, a coagulant feed for supplying sulphate of alumina or other suitable coagulant to the raw water, the filters proper, the clear water chamber, and the washing apparatus.

The sedimentation basin is capable of holding from two to four hours' supply; it has one or more baffles placed across it to break up convection currents and to cause the water to follow an indirect course across this basin. It may be made of concrete or puddled earth, or even large wooden tanks may be employed. A blow-off line is provided to carry away the sludge which settles at the bottom.

The chemical feed is a device for applying alum, sulphate of alumina, or other readily soluble chemicals in solution. It is so constructed that it can be set to apply any amount desired of the chemical solution to the incoming raw water and it must be so devised that fluctuation in the rate of flow of the raw water causes a corresponding fluctuation in the rate of flow of the chemical solution. The chemical solution is made up of a

definite strength and is contained in a small tank, and when applied by the chemical feed to the raw water should always show a definite number of grains per gallon of chemical applied to the water. These devices have in recent years been very accurately worked out so that it is possible to apply alum with a variation in quantity of less than one-tenth of a grain per gallon. This is a very important feature to the textile manufacturer, as an excess of alum might make serious trouble, while a deficiency lowers the quality of the filtered water.

The filters are of two types: pressure and gravity. If of the gravity type the settled water flows from the sedimentation basin to the filter and passes by gravity down through it, discharging at the bottom into the clear water basin, where the process of filtration is ended.

The gravity filter consists of a tank with the necessary exterior operating valves to send the water down through the filter bed in filtering, or upward through it in washing. The filter bed consists of sand; not any sand from a convenient sand bank, but a sand which has been screened and re-screened until every grain is of the same size. This is done to prevent the microscopic channels between the sand grains from becoming choked with finer particles of sand, thereby causing the filter to require very frequent washing. The sand bed rests upon a gravel layer and in this gravel layer are a number of devices variously called sand valves, strainers, strainer valves, screen valves, etc., which are in turn connected by piping to a main pipe leading across the filter and discharging at its outer end into the clear water chamber. The piping is embedded in concrete to support it, the sand valves projecting above and into the gravel.

The send valves have a very important office in the filter. All of the water which passes through the send must pass eventually through these valves. As it is necessary to retain the sand in the filter the orifices in these valves must be small enough to prevent any sand from escaping and must be numerous enough to permit the water to pass through without too much friction. Another and equally important office of these valves is to distribute the wash water uniformly under the filter bed when the current is reversed for washing. Any failure in this direction results in one part of the filter bed being washed and the other part being left dirty, so that when filtration takes place the capacity of the filter is either seriously reduced or else the portion of the filter bed that does permit the water to pass through is so greatly overworked that the quality of the effluent is impaired. Moreover, these sand valves are best constructed with orifices possessing some elasticity so that they can discharge any substances that would tend to clog them, as a clogged sand valve means, of course, an unwashed portion of the filter bed.

Some makes of filters are so constructed that only filtered water can be used for washing, while others possess the advantage of washing with either filtered or unfiltered water as desired. From the writer's standpoint, the latter is a distinct benefit as it occasionally happens that the supply of filtered water is so depleted that there is not enough on hand to wash the filter and run the plant, while if raw water can be used for washing there need be no interruption in the continuity of the flow to the mill.

These filters, of course, become choked at comparatively frequent intervals by reason of the retained impurities, and a rapid and efficient method of cleaning is necessary. Substantially, the washing consists in reversing the current so that the water passes up through the filter. This tends to agitate the sand grains and to carry away the impurities, but to accelerate the process it is advantageous to employ mechanical agitation in addition. This is effected by a powerful revolving wash rake with fingers which pass deep into the sand bed, or by forcing compressed air under the bed. The additional agitation given by either of these methods will loosen the impurities so rapidly that in from three to five minutes the upward flow of water has carried away all of the retained matter.

The machinery required for this process consists of a low-lift centrifugal pump for supplying wash water under low pressure, and a positive blower capable of generating three or four pounds air pressure.

The above description is for a gravity plant. Frequently conditions demand the installation of a pressure filter. This filter is identical in principle with the gravity filter, but is enclosed in a steel case to withstand the same pressume as that carried upon the main. The water passes downward through the filter in the same manner, there being only a slight loss of pressure in the main after filtration. A finer sand is used than in the gravity filter and the agitation of the upward flow of water alone is usually sufficient for washing the filter so that a simple reversal of the flow washes it in from three to ten minutes.

The washing process is an extremely important one. So long as the sand-bed is kept clean without concretions of mud around the grains a high efficiency can be maintained, but as soon as the filter bed becomes an agglomeration of sand and mud it loses its efficiency and soon becomes a nuisance. A properly constructed and properly operated filter plant should run at least ten years without requiring any renewal whatever of the filter bed or its removal from the container for any additional washing.

A filter plant is operated in the following manner: At the entrance to the sedimentation basin the water receives its dose of sulphate of alumina. If algae are very troublesome copper sulphate or calcium hypochlorite may be used as an algacide. The water then flows slowly on through the sedimentation basin, eventually reaching the filter. The process is continuous; that is, as water is drawn from the basin a corresponding amount is always flowing in. In its passage through the chamber, which occupies from two to four hours, the alum has entrapped the very fine particles of matter which might be difficult to hold in the filter and has gathered them into comparatively large masses which are quite visible to the naked eye and which have a tendency to settle with considerable rapidity. In addition, the alum has also

attacked the coloring matter derived from peat, leaves and other vegetation along the path of the stream. Moreover, nearly all of the waste dye liquors that may be present in the water will respond to the action of the alum and will be converted from the soluble to the insoluble form. To compare the action of alum with some of the processes in textile manufacturing it might be likened to a mordant in the dyeing process; that is, the alum tends to precipitate and form lakes of the various coloring matters which are found within the water, and the sand of the filter bed corresponds to the fabric which is being dyed, so that in the chemical treatment of water we really anticipate the dyeing process and exhaust all of the dyes by merely dyeing the filter bed.

The next question which naturally arises is, what becomes of the alum and why will it not interfere with subsequent dyeing and bleaching processes? Previously in this article we have discussed the necessity of an accurate chemical feed. The necessity of this accuracy now becomes apparent. When alum or sulphate of alumina, which is a very similar substance and more generally used, is applied to the water in solution it combines with the alkaline carbonates which naturally exist in all streams, to form an insoluble earthy substance known as hydrate of alumina. This hydrate of alumina is somewhat gelatinous and can be readily retained by the filter. So long as the amount of alum fed to the water does not exceed the amount of carbonate of lime, just so long will every trace of alum be decomposed and rendered insoluble so that it can readily be removed in the subsequent filtration process.

In certain exceptional instances where the normal alkalinity of the steam is very low the deficiency is made up by applying small quantities of soda or lime through the chemical feed to produce an artificial alkalinity, which gives the same result in the end. It is apparent, of course, that should alum be fed in excess of the alkalinity of the water there would be free alum, and it has been inattention to this particular feature in times past that has led to the disfavor with which alum as an aid to filtration is unjustly viewed in a great many establishments.

The above interesting and really simple reactions take place largely in the sedimentation basin, and a very considerable percentage of the coagulated matter falls to the bottom of this part of the plant,—where it is afterwards disposed of by means of drain valves,—and the water flows on by gravity to the filters, through which it passes merely by its own weight and is discharged at the bottom bright and clear and in condition for use. This ends the filtration process.

Only the large filter plants are so completely equipped as the above, which might be considered an ideal plant. In the majority of instances the requirements are satisfactorily met by a comparatively small rough-and-ready apparatus that can be attended by the ordinary laborer and will give fine results. There are twenty such filters installed to one complete plant, and practically the only difference in results is an economic one; that is, the ideal plant will filter the water with less attention and less coagulant than the small service plant, but the small plant will give equally as good water as the larger one.

The small service plant usually consists of a pressure filter only, with a pressure chemical feed which applies the alum at a sufficiently accurate rate to avoid the danger of overdosage, yet supplies enough to give the desired reaction. It is connected directly to a pressure main, either from the city supply or from a pump, and the water is forced through it, the chemical reactions taking place in the upper body of water overlying the filter bed itself.

When this filter gets dirty the back pressure may run up to five, ten, twenty, or even more pounds with a corresponding reduction of the flow through it. These features are really advantageous, as the filter, by becoming nearly water tight, makes attention compulsory.

These filters are washed by reversing the current, and in from five to ten minutes are perfectly clean, either raw or filtered water being suitable for this purpose. From one to three times daily is required, depending upon the condition of the raw water.

With some waters the contamination is of such a nature that it does not need chemical treatment, and in those cases simply passing the water through the filter for the straining effect gives satisfactory results. Such cases as this, however, are uncommon and unfortunately are getting rarer every year.

With reference to drinking water it is customary to guarantee a removal of at least 97 per cent. of the bacteria. This bacterial guarantee is dependent, of course, upon the use of a coagulant, usually sulphate of alumina, but within the last two years it has been found that calcium hypochlorite, or as it is more commonly known, chloride of lime or bleaching powder, can be used with great advantage as an adjunct to filtration. This substance is applied in quantities ranging from 8 to 16 pounds per 1,000,000 gallons of water, and in even this infinitesimal quantity it destroys all of the bacteria except one or two highly resistent and perfectly harmless species.

The applied calcium hypochlorite is converted in the process to an inert, harmless substance, quite similar in its characteristics to common table salt. Perhaps the most notable instances of the use of this chemical are the water supply of the Chicago stock yards, and the municipal supply of Jersey City, both of which have been using it with great success for the past two years.

Omitting interest on the investment the cost of filtration ranges for the various waters from 30 cents to $2.50 per million gallons. This figure includes attendance, cost of chemicals, power required for washing and repairs. The great difference in cost is due to the fact that some waters require no chemicals while others require a very considerable amount indeed. The size of the plant also affects somewhat the cost of filtration, the large plants being proportionately more economical to operate than small ones.

In the present state of the art of filtration there is hardly a stream in the country which cannot be reclaimed and made satisfactory for almost any textile purpose. The writer makes this statement

advisedly, because there are certain substances like salt and other sodium compounds which cannot be affected by filtration. Of course, innocence is better than reformation, but if the stream that flows by your place is odorous and unsightly you do not need to condemn it, because the chances are very much in its favor that it can be purified and rendered satisfactory for almost all, if not all, of your operations that require water. Streams like the Passaic River at Paterson and Passaic, the Blackstone River at Providence, and many others less notorious but equally as bad are being filtered and utilized with a fair degree of satisfaction and a great saving in cost over city other hand, even the best of streams are greatly improved by filtration because they usually carry water purchased from the municipalities. On the more or less suspended matter, and in the summer contain large quantities of algae which sometimes produce very much trouble.

Taken altogether it can be set down as a general rule that every dye house and every bleachery should be provided with filtered water.

The Nature and Cause of Waste Fiber in the Mills.

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There was a time in the history of the manufacture of fabric from raw fiber when the great consideration was to get some kind of cloth from the fiber at hand. Now we are able to get a particular kind of cloth from a special fiber. But be it said to the credit of the ancient art of hand weaving that less waste was incurred then than now,—that is less waste of fiber. There was far more waste of human energy, but before human society was as completely organized as it is now, channels for the use of human energy were much more restricted than now and hence what difference did it make if primitive people did spend weeks and sometimes months making enough cloth to hide their nakedness.

We are living today in a new era of a new world and not more strikingly so in any other industry than in the cotton industry of the United States. Therefore we must show all signs of progress and development, and our modern mills must turn out each day many yards of fabric per employe in order for us to make clothes for the world, and even then only about 80 per cent. of all the people of the earth use cotton cloth, and possibly only about 60 per cent. of the clothing worn by those who use it is cotton clothes. It is also estimated that only 25 per cent. of all the peoples of the world using cotton fiber for clothing, use the machine woven cloth. Cotton cloths are finding their way into a great many lines of industry and new demands are being made for them every year, all of which seems to point out clearly the need of larger cotton fields and higher yields per acre.

The question of waste, then, is never an untimely subject in an industry that is assuming such proportions, and whether the present discussion be fair or foul, good or bad, it must be conceded that I have chosen well. When fiber was made slowly into yarn by hand among the ancients, there was very little loss, because reasons for loss could be so easily guarded against. The mills have no choice in the selection of fibers nor in overcoming weak places in yarns. By hand eleven pounds of lint cotton made ten and three-quarters pounds of yarn. In the modern mill, eleven pounds of lint make ten pounds of yarn. The great saving comes then in the great rapidity with which machinery makes fabric out of raw fibers.

Waste may be divided into five classes: Trash, sand, diseased fiber and motes, broken fibers, good fibers lost through the imperfection of the mill machinery.

The first two will not be discussed in the present paper, as they might be considered problems for the cotton farmer rather than for the mills. It is the custom of the farmer to put in the sack everything that looks like cotton, and some things that do not, and hence much sandy and diseased cotton goes into the clean spotless, which fact always depreciates the value of the good without adding much weight to it. If the weight of the poor cotton compensated for the depreciation in valued caused by the carelessness, it would be a problem for the mills and for the mills only to work out the waste; but what follows will illustrate the importance of cooperation between the mills and growers. Upon a careful count of several bales of cotton gathered from the fields at the Georgia Experiment Station in 1908, it was shown that about ten bolls of cotton out of every hundred were diseased in part or in toto.

Cotton will average about one hundred thousand bolls to the bale of short staple upland. Therefore it is safe to say that out of this number at least ten thousand bolls are diseased, defective and colored to some extent. The diseased bolls are much lighter in weight than those not diseased. Therefore instead of having a loss of 10 per cent. in weight we have in fact a loss of only about 4 per cent. This seeming inconsistency is made clear upon a consideration of the fact that most of the diseased bolls have only one or two locks diseased, and all diseased cotton is known to have lost much of its weight.

Another source of considerable waste is that of motes or undeveloped seed. These immature seeds always have small quantities of very inferior fiber attached to them, which is not fit to be woven into fabrics. Upon a careful count of motes in a given number of bolls of cotton in sixteen counties in the state of Georgia, it has been found that medium cotton averages one of these motes to the lock, or about four hundred and fifty thousand to the bale. Experiments in cotton breeding by careful selection show the possibility of eliminating waste from this source. The number of motes was reduced to less than a hundred thousand to the bale in three years. The motes cause a considerable loss in drawing from the bulk of the fiber many good fibers that would otherwise go into fabrics. The mills are unable to separate these from the good fiber, as a small per cent. of it will go out with the motes both in the picker room and in the carding room.

With these ten thousand colored and defective spots and four hundred thousand motes to the

bale, a sample always grades from one to two grades lower than the same cotton without them. Several bales where separation of good from bad bolls was made, brought one to one and one-fourth cents per pound more on the market. This would show a gain of $5.00 on a five hundred pound bale of cotton, by careful picking. At the same time we have lost 4 1/2 per cent. by weight, or 22 1/2 pounds at 12 cents amounts to $2.70. But this defective cotton brought six cents per pound at the waste mills. So the net loss was only $1.35 on the poor fiber. Taking this from the $5.00 gain we would have a net gain per bale of $3.65. This gain on ten million bales would be a revenue of about thirty-six and a half million dollars annually to the cotton belt of the United States, without having to make another pound of cotton.

This is a very important matter because the carefully gathered cotton is actually worth to the mills this difference intrinsically, and the machinery made a far more uniform grade of cloth from it than from the cotton that has been carelessly gathered, for at best, much of the poor fiber left in the cotton by the picker will go into the cloth. The experiments along this line warrant us in predicting that mills will be able to run with little more than half the labor force if they can get carefully picked cotton to supply them. There will be far less breaking of yarns, and one employe can operate almost twice as many spindles as at the present time and under the present conditions.

The source of broken fiber before it reaches the mills is mostly from ginning and compressing. The rapid running of the gin is very costly to the cotton industry, as it is estimated that about 3 per cent. of the fiber is broken in this way, and a much larger percentage in exceptional cases, especially where the cotton is damp or picked a little early. Not a great deal of study has been given to the effect of compression on the fiber, but some figures are at hand for our consideration. Athens, Ga., is a large inland cotton market and supplies many thousand bales of cotton to the local mills and many other thousands to the eastern and foreign mills. On account of the exceptional quality of the fiber of the cotton that comes to the Athens market, many Southern mills buy their supply there in preference to the local markets. One of the mills at Greenville, S. C., which is only a hundred and thirty-five miles from Athens, obtains several thousand bales annually from the Athens market. It is a well known fact that the railroads have the privilege of compressing or refusing to compress all the cotton hauled over their lines, they bearing the expense of compressing. In consequence of this and the further fact that cars will take twice as many bales of compressed as of non-compressed bales and then not to be overloaded, they usually compress the cotton. When it is to be shipped only a short distance and in comparatively small quantities, the roads will under favorable conditions haul the cotton uncompressed.

On all orders received here from the mill above referred to, a premium of 50 cents per bale is offered to the railroads not to compress the cotton, claiming that it pays the mill to offer this premium in preference to having the cotton compressed. How does it pay? The mill finds that there is a fraction greater loss incurred in the manufacture of goods from the compressed cotton, and they find further that the compressed cotton is a fraction more difficult to make into yarn than the non-compressed cotton. My own investigations have not been applied directly to the question of difference between the loss in the compressed and the non-compressed cotton, but the experience of the mill referred to is quite convincing to me. Besides it is a generally conceded fact that the sudden and heavy blasts of air caused by forcing the air out of the farmer's bale by the act of compression breaks the fiber to some extent. My attention has been called to the slow moving hydraulic gin compress whose superiority to the old compress is evidenced by the fact that the mills have been known to offer a premium of a dollar a bale for cotton pressed in them.

Just to what extent the fibers are broken by the machinery in the mills themselves is a hard problem, as it has been impossible to tell which of the waste fiber was broken in the mills and which entered the mills already broken. Since the great bulk of loss is incurred in the picker room and in the carding room, and since the processes in these rooms occasion the more irregular strain on the fibers, it is evident that the greatest damage done by the mills is done in these rooms. We would not overlook, however, the loss in all the other processes of the mills. Even up to the sizing of the yarn and in the spinning rooms we find relative percentage of loss, due largely to the working out of broken and inferior fibers.

A very inviting field for Dr. N. A. Cobb, in charge of the Cotton Fiber Investigations, Washington, D. C., is a study of the relative losses, the lengths, the breaking strengths and other data of the fiber that is lost in the different processes of the mills. The laboratories there are well equipped for such investigations, and I am sure that the mills would be largely benefitted by such investigations. This work would also help to locate the various sources of such losses.

Observation of these losses has induced me to spend much time in the mills and out, trying to locate the evil, and seeking a remedy for the more complete recovery of the loss. What is the total loss in the average southern mills based on middling cotton? In the Kincaid Mills at Griffin, Ga., one out of every eleven bales that go into the mill is lost. This deduction is based on many calculations of runs for definite numbers of bales of cotton, also for runs of a day, a month, and a year. Those mills make crash and damasks. These losses make a total of 9.11 per cent. of the cotton that enters the mills; of this almost 5 per cent. is lost in the picker room, 2 per cent. in the carding room, 1 per cent. in the roving room, and 1 per cent. in the spinning room. In the mill at Hogansville, Ga., out of an average of 154,735 pounds of cotton there was an average loss of 20,826 pounds or 13.11 per cent. This mill makes heavy cloth for rubber belting and is an exceptionally well regulated mill. The average per-

centages of loss as found on the well kept records of the superintendent are as follows:

	Per Cent.
Opening and picking	.0225
Card room	.0381
Spinning	...0074
Twisting	.0044
First spooling	.0041
Beaming	.0018
Filling or weft	.0021
Weaving	.0021
Weaving	.0045
Weaving	.0061
Cloth room	.0030
Bagging and ties	.0472
Total	.1435

The records on which these losses are kept are the best I have ever seen. The waste fiber at present goes into cheap cloth such an engine cloth and cheap glove cloth. It is baled at the mills and sold at the rate of from one to six cents per pound according to the grade of waste. The Southern Manufacturing Company of Athens, Ga., where waste is used altogether in the making of the weft, have found that the waste after it has been cleaned and ready for use cost, on an average, seven cents per pound net, and in view of the inferior grade of fabric made from it, the mill has to work on a very close basis in order to make it pay a reasonable dividend.

This great bulk of waste is certain to be a factor in the cotton industry of the world for a good many years to come, and it seems that we should prepare to deal with it in the best possible way. Therefore I believe that the following facts and figures will have a special meaning to the members of this great Association. If we grant that, well trained labor will become available, all large cotton mills and associated mills should have a connection with the artificial silk mills to divert this waste into paying channels. There is considerable demand for this material in all parts of the world, and no raw material is equal to cotton fiber for making cellulose,—the basis of artificial silk. In fact as we know it is almost pure cellulose to begin with, and can be made into solution at a minimum cost for the spinning of the silky fibers. I have not been able up to the present time to find the cost of installing machinery for this work, but from the following figures, I am persuaded of the importance of looking into this method of using waste fiber.

There are three leading processes employed in the manufacture of artificial silk, these being the chardonnet, or nitro-cellulose process; givet, or supro-ammoniacal; and xanthate-cellulose or viscose process. According to recent issues of the American Silk Journal, there are at the present time some thirty establishments throughout the world engaged in the manufacture of artificial silk, approximately distributed by countries as follows: United States, 5; Germany, 7; France, 7; Belgium, 3; Italy, 2; England, 1; Spain, 1; Austria, 1; and Russia, 1. While artificial silk is being made at this time in the United States in very small quantities, it is reported that the largest plant in the world is about to be constructed at Chester, Pa. Germany and England are producing the best artificial silk yarns, France having fallen behind in this respect. The German yarns are made by the viscose process. While the total American consumption of artificial silk is 1,450,000 pounds, 880,000 pounds of this comes from France, Germany and Italy.

More than 30,000 persons are employed in the industry, and the production in 1909 is estimated at about 10,000,000 pounds. The distribution of the production, according to the three processes of manufacture, is nitro-cellulose, 4,400,000 pounds; cupro-ammoniacal, 4,000,000 pounds; viscose, 1,600,000 pounds.

All grades of cotton, wood pulp, and any other material susceptible for chemical conversion into cellulose are available as materials for the basis of the manufacture. The cost of production is about $1,25 per pound under the nitro-cellulose process; $1.10 for the cupro-ammoniacal; and about $0.70 for the viscose. The selling price of the product averages about $2.50 per pound for the first process; $2.40 for the second; and $2.00 for the third.

With this big margin of profit diminished by half, the mills would be able, it seems, to add this feature with perfect safety, and would possibly make it the best paying division of the mill in proportion to the capital invested.

Another question of vital interest to the mills and growers jointly is: How can the great importance of properly caring for cotton be impressed on the minds of the growers? In this respect there seems to have been no improvement since cotton was first cultivated commercially. Attention is called to the fact that the packing of cotton in round bags by tramping, which prevailed from 1780 to 1810, was in the latter year replaced by the screw packed, square bale. Since this time, practically no changes have been made excepting the substitution of iron bands for ropes, and the introduction of the steam compress.

The following table was taken from Baines's History of the Cotton Manufacture, 1833:

	lbs.
Cotton wool imported	303,656,837
Cotton wool consumed in manufacture,	282,875,200
Yarn spun (counting 1 1/2 ounces per pound loss)	256,174,400

This shows a loss of 9 1/2 per cent. of the weight of the total fiber that went into the mills, just about what has figured to be the average loss in the modern mills. This would seem to show that the loss must be brought about by the nature of the cotton which has improved very little. We are trying to point out the necessity for permanent improvement along this line to the farmers in the state of Georgia, and we feel that our efforts are bound to bring forth fruit within the next few years; but we must have the cooperation of the mills in order to make our work effective. They must be willing to make good just what we save to them. If there is less waste by virtue of our efforts, they must offer a premium on the cotton in order to help us stimulate farmers to produce the cleanest and best possible cotton.

The mills we frankly admit do this sometimes, but the universal complaint among growers is that our suggestions would be too tedious to follow, especially since the farmer gets no more for the clean cotton than for the carelessly gathered cotton. They also think it would not pay unless every grower would do the same thing. Could we not formulate some plan by which every lot of cotton of 100 bales or less would be worth a premium on the markets, if the proper attention has been given to it during the breeding and the picking season? This would be the means of putting every farmer on his own merit, as well as it would be the means of bringing to the mills the best possible grade of cotton.

The Textile Industry in Hungary and Its Relation to the Textile Industry in Austria, Germany, and the Balkan States.

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In Hungary the most important textile industry is silk. Other textiles manufactured, in the order of their importance, are wool, cotton, hemp, flax and jute.

SILK INDUSTRY.

Among the countries which have endeavored in recent times to revive sericulture, Hungary claims one of the first places.

Throughout the eighteenth and the greater part of the nineteenth centuries, all the efforts made for this industry proved of no avail, and by the year 1879 it had almost disappeared from the kingdom. But it had been clearly proved that the climate of Hungary and the economic conditions were most favorable for the work, and this led the government in 1880 to make a fresh effort.

As the restarting and developing of so complicated an industry was attended with special difficulties, the government decided that it would not, as on former occasions, attempt to conduct it through the ordinary government departments, but instead it entrusted it entirely to a private person, placing the necessary funds at his disposal free of interest, and giving him a free hand to work in the way he might find most likely to lead to success. The result has amply justified this unusual course.

An establishment for the supply of the best seed, i. e., silkworm eggs, has been erected at Szekszard. Here over 3,282 pounds of Hungarian seed are produced annually, and 1,500, to 2,000 pounds of the best French and Italian seed are imported in order to maintain the vigor of the race. All the seed, native and imported, is subjected to careful microscopic examination, there being 280 microscopes engaged on this work.

The government reserves to itself the sole right to supply seed in Hungary. Up until now, 4,700 pounds of seed have been distributed gratuitously to rearers.

During the last 76 years the government has distributed 77,976,055 mulberry trees, two to three years old, 4,874,294 mulberry trees full grown.

It maintains, at its own expense, 83 nurseries for mulberry trees, and supervises 5,191 Agrarian schools, which are obliged to set apart two-thirds of their land for mulberry cultivation.

A law enacts that in all communes suitable for sericulture all unoccupied land and the sides of all roads shall be planted with mulberry.

The government places at the disposal of the rearers, free of charge, 80 per cent. of the mulberry trees on public land.

In each sericultural commune there is a government superintendent, whose duty is not only to distribute the seed, but also to give full instructions to rearers and watch over their work from the hatching of the eggs onwards. There are also district inspectors and chief inspectors, with assistants, appointed to see that the superintendents carry out their duties properly.

Five hundred thousand pamphlets are distributed gratuitously every year, giving instructions on the rearing of the worms and the cultivation of the mulberry. Also free lectures have been given annually in over 1,300 communes, illustrated by 150 dissolving views showing how the work should be done. Now that silk is cultivated in 3,000 communes, a lecture will be given every second year in each.

The government undertakes to purchase all the cocoons produced. For the convenience of the rearers, 154 stations have been established where cocoons are received.

As soon as the cocoons are bought, they are sent to a drying house, where the chrysalis is killed, and the cocoons thereafter are sorted according to quality. There are 23 of these houses each capable of containing 350,000 to 400,000 pounds of fresh cocoons.

In the older houses the chrysalis is killed by steam, and the cocoons are afterwards dried by hot air. In the newer houses, the whole operation is done by hot air, which gives much better results than the former process.

At first the government devoted its attention solely to the development of cocoon production, but as in certain classes of the population, there exist special qualifications for work in filatures, it did not seem reasonable that the cocoons should all leave the country and the work of reeling them be given to foreigners, when it could be done as well, or better, at home. Also it was desirable that the high natural quality of Hungarian silk should be known, and this could be most effectually ensured by reeling the cocoons in the country. With these objects in view the government has erected filatures at nine places, with 1,108 basins.

One filature at Tolna is retained in the government's hands for the purpose of training managers, etc. The remaining filatures are let to private firms.

The government leases the filatures to foreign firms, and grants the leaseholders exemption from taxes for 15 years, and also gives the requisite supply of dry cocoons on very favorable terms, viz., at 50 cents per kilogramme (5 cents a pound) below the average price for the month in Milan.

Hungarian silk is highly appreciated in Europe and also in America. Its special qualities are seen in its color, brilliancy, and fiber, as well as in its elasticity and flexibility, which properties,

rarely found combined, render the silk particularly adapted for weaving in the raw state.

It is thought that these distinctive features are due to the leaf which is all from trees that have not been grafted, and though these give a smaller crop of leaf, it appears to be of a nature that imparts the better properties to the silk produced by worms fed on it.

Many Italian reelers, especially those of Frioul, give the preference to Hungarian cocoons over all others. Often also they receive orders for silk with the stipulation that it is to be reeled from Hungarian cocoons. For this fine silk production we have only three weaving places.

The government desires to see this branch of the work increased, and offers the following advantages for the construction of factories:

Exemption from taxes for fifteen years, and an annual subsidy for ten consecutive years of ten, twenty or thirty thousand Korona ($2,000, $4,000 and $6,000), according to the importance of the factory.

THE COTTON INDUSTRY.

The cotton industry in Hungary is not important. Our cotton spinning mills contain only 224,000 spindles working both day and night, and our weaving sheds contain 5,000 looms.

There are twenty-three mills engaged in the manufacture of cotton goods, employing 9,412 operatives, and having engines generating 12,320 h. p. The spinning mills use Indian and American cotton; the counts of yarn spun being between 8s and 50s. Most of the mills use ring frames; a few are arranged for self acting mules.

The head of the spinning department is the "betrieb director," or as he is called in England, the manager.

The weaving shed is divided into sections, each of about fifty looms. At the head of each section is an overlooker who is assisted by a mechanic in his work of keeping the machines in good working order and attending to any breakages which may occur.

In Hungarian weaving mills as in English weaving mills, the weaver attends to four ordinary looms or from 16 to 20 Northrop looms.

Almost every mill has a bleaching plant attached to its spinning department. We have a small dyeing and printing industry, which is as yet undeveloped.

The weaving mills produce only simple fabrics, such as plain cloth, chiffon, Oxford shirtings, grey shirtings, white shirtings, table clothes and towels.

The difficulties to be overcome in establishing the cotton trade are important, but not discouraging. They are firstly the difficulty in finding suitable labor, and secondly, Austrian competition.

Austrian manufacturers have forced the Hungarian spinners to join the Austrian Cotton Spinners' Association, which is similar to the English Cotton Spinners' Association and so all yarn manufactured in Hungary first passes through the hands of Austrian agents.

Most of the imported cotton yarns and fabrics come from Austria. The statistics for the year 1909, up to September, show that the total cotton manufactured goods imported into Hungary are valued at $44,338,455; while cotton imports to the value of $41,282,835, or 94 per cent. of the total imports, come from Austria.

Hungarian spinners do not themselves spin waste yarns, all waste is exported to German and Austrian waste spinning firms.

Hungary does not produce one-fourth of the cotton goods which she uses; there is a small export trade to the Balkan States, more especially to Servia and Turkey.

This export trade is also carried on through Austrian agents: many of the goods being exported to Austria and then reexported from Austria to the Balkans.

From January 1 to September, 1909, Hungarian cotton exports amounted to $5,515,665; 83 per cent. of these exports went to Austria.

The yarns imported are generally either doubled yarns or dyed cop yarns.

One-quarter of the fabrics imported are printed cotton goods.

THE WOOL INDUSTRY.

Hungarian sheep provide wool manufacturers with the best raw materials. Each year more than 200,000 cwt. of raw wool is produced; among which all the best qualities of wool are to be found, such as merino, crossbred and mohair.

One-third of the wool grown is washed in Hungary, generally by hand; only 35 per cent. being washed in factories. About the same proportion, namely one-third, is manufactured in Hungary.

There are sixty-eight woolen mills employing 5,655 operatives. One hundred and twenty thousand cwt. of raw wool are exported yearly, of which 80 per cent. goes to Austria.

There are very few wool weaving mills. The total number of looms running does not exceed 5,000. These weaving mills have a small spinning department attached to them for the preparation of the lower quality yarns, they have also departments for dyeing and for finishing.

Much of the cloth produced is woven in the houses of the operatives, that is, the mills give so much raw material to the weavers and they take it to their homes and bring back the finished article to the mills. This is a very important branch of the weaving industry.

There is a very small import of woolen yarns into Hungary; most of the trade being done in doubled yarns from England. Most of the woolen imported goods are either ladies' dress fabric, gentlemen's suit cloths, linings, half wool shawls, tapestry and laces.

The value of the woolen goods imported yearly is $21,794,275; 94 per cent. of these goods come from Austria.

This large import of woolen fabrics is most regrettable when one considers that there is more raw wool produced than is necessary for the national consumption.

HEMP, FLAX AND JUTE INDUSTRY.

Unlike the cotton and silk trade, the hemp and flax industry has been established for many years.

The retting and steeping processes are generally done by the peasants in their own homes.

Most of the flax and hemp is prepared for spinning in Hungary, but much of the raw material is exported to Austria, Germany and England, where it is spun.

There are twenty-three houses engaged in the preparation of hemps and flax fibers, employing 2,833 operatives.

Twenty-six mills are engaged in the manufacture of hemp and flax yarns; 3,671 operatives being employed in this industry.

The production of these mills is not so great as the national consumption, and therefore we find there is a large import of flax yarn and linen fabrics.

There are twenty hemp spinning and weaving mills in Hungary, employing 2,371 operatives. These mills produce goods which are generally sold in the home market, such as nets, ropes, strings, tarpaulins and other materials used by farmers. There is not a very big importation of hemp goods.

Hungary has only three mills manufacturing jute yarns, each of which employs over a thousand operatives. These three mills produce over 300,000 cwt. of jute a year; most of the jute is made into sacks, but a considerable quantity of jute fabrics is imported.

There is a small export trade to Bulgaria, Turkey and Asia Minor.

The government has established a testing laboratory in Buda-Pest, similar to the German "Textil Versuchs und Condition ieraustalt," in which researches are carried on which seek to maintain the high quality of the Hungarian wool.

THE LABOR QUESTION.

The difficulties which arise in securing skilled labor in Hungary are enormous. The workmen have no technical education, many of them have no settled occupation. In the summer they work on the farm, and it is only during the winter months, after the crops have been gathered, that they can be induced to work in the mills and factories.

This scarcity of labor during the summer months reduces the production of the mills by 20 to 25 per cent.

The fact, that 80,000 laborers emigrate yearly to America shows that workmen are in the country, then where is the difficulty of finding skilled labor?

The difficulty lies in the fact that the average Hungarian workman is not a skilled laborer, and also that the workmen are to be found in the towns and cities, whilst the mills and factories in which they should be employed are situated to a large extent in isolated districts in the country.

The education of the Hungarian workman is of vast importance in the further development of her commerce and industry.

Only 4.8 per cent. of the population are employed in mills, factories and warehouses; in Austria 10 per cent., of whom 2.6 per cent. are employed in the manufacture of textiles; in Germany, 24.2 per cent. of the population are workmen and laborers, 5 per cent. being employed in the textile industry. So that more people are employed in the German textile industry, than are employed altogether in Hungary.

Most of the workmen found in Hungarian spinning mills and weaving sheds are not Hungarians at all, they are either Bohemians or Slavs.

The factory laws are very similar to the English; they give many advantages to the workpeople. The law does not allow boys and girls under fourteen years to work in mills and no one who is under age may work during the night. The working hours must not exceed twelve.

Great care is exercised in the prevention of accidents; government inspectors, responsible to the Minister of Commerce, visit and examine the mills regularly.

There is a separate department in the Board of Trade, which encourages and assists in the formation of unions and associations, which have for their object better housing and better working conditions for the operatives and workpeople. These associations are not only interested in the health and personal well being of the workpeople, but they are, by means of free lectures and technical classes gradually transforming the unskilled laborer of a few years ago into the skilled and educated operative of today.

In many mills there are nursing homes in which the children are cared for and nursed whilst the mother is working in the mill.

There is an Assurance Association which provides the workpeople with free medicine, nursing and medical attendance in case of illness or accident. If the operative is unable to work, he or she is paid so much a day whilst away from the mill.

Larger mills have under their own management similar institutions, the operatives paying a small sum weekly towards its support.

In Hungary, as in all other countries, there are two classes of mills; A, those which are situated in or near the towns; B, those built in isolated districts in the country far away from towns or great industrial centres.

The conditions holding in mills of the former class are perhaps not so widely different from those found in Lancashire mills. It will be more interesting, therefore, for us to turn to those mills which are situated away from the towns and cities. Many are the inducements which these mills offer in order to secure suitable workmen. Model houses, schools, hospitals, everything which will attract operatives and induce them to settle in houses of their own near the mill in which they work.

The food of the workmen is not forgotten. Large dining rooms are built, in which the operatives can obtain cheap meals.

I have had practical experience of the domestic arrangements existing in large factories, such as the Hungarian Textile Industry Limited; a spinning and weaving mill employing between 4,000 and 5,000 operatives. And it is without hesitation that I say the operatives working in such a mill are more comfortably housed and better fed than are the men and women employed in the big spin-

ning and weaving mills of Lancashire.

Each employee has lodgings allotted to him according to his station, manager, clerk, overlooker or workman. There are dining rooms for the directors, dining rooms for the clerks, dining rooms for the men and dining rooms for the women.

Dinner tickets and supper tickets are issued weekly. The cost of the meals 2 cents for dinner, 4 cents for supper, is deducted from the operatives weekly wage.

The Hungarian Textile Industry Limited has under its own management a hospital, a school, a small library, an Accident Insurance Company and an association for the sale of everyday necessities.

In Hungary and especially in the textile industry, the length of the working day is generally eleven hours.

The mills commence at 6 A. M., breakfast time is from 8 to 8.30, the operative has his breakfast at the side of the machine, whilst it is running. In almost every mill the dinner bell rings at 12, work is recommenced at 1 P. M., and the machines run without interruption until 6 P. M.

The night operatives commence work at 6 P. M., and do not leave their machines until 5 o'clock in the morning. The machines are therefore only still for two hours during the day.

There are six whole working days of eleven hours each, that is, there are sixty-six working hours per week for the day operatives and sixty-six working hours per week for the night operatives. Therefore, the machines are at work for one hundred and thirty-two hours during the week.

The long working day of eleven hours is no doubt to a certain extent responsible for the large number of accidents which occur in Hungarian mills. Not only is this due to the increased time during which accidents might occur, but also to the fatigue and resulting carelessness brought by the long and monotonous day's work. In the summer months, where many of the workmen forsake the mill for the farm, the working hours have to be curtailed considerably. This is more noticeable in the weaving sheds, many of which work for an hour longer in the day and stop work altogether during the night.

WAGES.

Wages in Hungary are not fixed, as they are in England by unions and federations.

They vary considerably in the different districts. I shall consider the wage question under three heads, the wage paid 1, to children; 2, to women; 3, to men.

CHILDREN'S WA GES.

Child labor is most essential in textile mills; but it would be only reasonable and humane to employ children above a certain age. No child may be employed, who is under fourteen years of age and children from fourteen to sixteen may only work eight hours during the day. These laws are not rigorously enforced, and it is not uncommon to find children working in the sheds who are not more than twelve and sometimes ten years old. No great care is taken of these young children.

I have seen groups of boys and girls trudging down to the mills at six o'clock on a frosty morning, when the ground was covered with snow, carrying their dinner behind them in little satchels. Many of them come from distant villages four or five miles away and if these children are to be at the mills before six o'clock, they must get up at three or four in the morning. Under these conditions, it is not to be wondered at that I have seen children sleeping by the machines on which they work. Very young children are employed to put the cops in the hoppers of Northrop looms.

The daily wages of children from fourteen to fifteen years of age is 6 cents or 8 cents, from fifteen to sixteen they do not generally average more than 8 cents or 12 cents a day.

WAGES OF WOMEN OPERATIVES.

Girls come into the factories as helpers and mill hands at an age when one would rather expect to find them at school. Girl helpers get a wage of from 16 cents to 20 cents a day. Weavers are paid piece work, the wage varying in proportion to the number of looms which the operative works and also for different classes of cloth woven. The wages are not consistent in all mills. In order to encourage the girls in their work, many mills offer a bonus to those girls whose weekly wages exceed a certain amount, thus a girl whose wages exceed $6.25 for two weeks receives 50 cents bonus. The payment of this bonus is rather the rule than the exception, the average wage being about $2.50 a week.

MEN'S WAGES.

An average man's wage is lower than in England; but our men are not thrifty, and whether the wage is large or small, it disappears in the same way, namely in the consumption of beer and whiskey.

A man's weekly earnings vary from $1.50 to $3.50 a week. In the spinning shed the wages are calculated out according to the amount of yarn produced. A weaver's wage may be anything from $2.50 to $3.75; a spinner's wage is about $3.75, the maximum being $6.25.

The managers, spinning masters and overlookers are paid monthly. Overlookers get a wage of from $20 to $30 monthly, mechanics from $10 to $20 monthly.

Looking into the future one sees great changes in the industrial life of Hungary, situated as she is between the great European powers and the East, she must eventually absort a great part of the trade at present carried on between Austria and her Eastern neighbors. Such a change whilst decreasing the trade of Germany and Austria, would give back to Hungary the important position which she held in the middle ages.

The situation of Hungary is reversed, no longer is she the defender of Western Europe against the Turkish hordes; she has now to defend her own industrial interests against the competition of Austria and other foreign powers.

Economical Lubrication.

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Lubrication, as we understand it in mechanics, is the application of or introduction of some substance that will cling to or flow between the surfaces of bearings and journals of engines and machinery and keep the metal surfaces from coming in direct contact, thus preventing excessive friction and consequent heating.

Lubricants can be divided into three general kinds or classes,—fluids, plastic and solids.

To the first named class belong the various oils, to the second the greases and to the third such substances as graphite, talc or soapstone, mica, etc.

Where the speed is high and the pressure great, oils are, in nearly all cases, the most satisfactory lubricants to use. They cling to the contact surfaces, forming an elastic coating to the metal, keeping them apart, absorb the frictional heat and carry it away. Another advantage they have, is, that they can be had in almost any desired grade or density, from the thin spindle oils to the heavy dense cylinder stocks, and they do not become rancid or gummy and contain no free acid.

As probably all of you know, in early days of engineering and mechanics, the oils used were all of animal or vegetable origin, such as lard oil, whale and sperm oil, rape seed or colza oil, olive oil, etc. These, while of good lubricating value, had their faults or disadvantages. In the first place, they were expensive; being of organic origin they had a tendency to become rancid and the content of free acid increased on exposure to air, etc. In more recent years, these have been almost entirely displaced by the petroleum or mineral oils. These are cheaper and, in many respects, better lubricants. Besides, they do not change their condition on exposure or in use, provided they are kept clean.

The greases are more suitable for use on slow moving machinery and where the pressure is not great. There are places, however, where the speed is comparatively high, but the pressure is light, where, if the proper grade or consistency be selected, a grease will often give excellent results. As a usual thing if grease be used indiscriminately on a large scale, especially in textile machinery, there will be a noticeable increase in the friction load.

Greases may be divided into two classes, the lime and potash soaps or high melting point greases and the tallow base or low melting point greases.

The first are made by combining a small amount of fatty oil into a soap by means of lime water, caustic potash or other alkali, and mixing it with a large amount of petroleum oil, such as engine oil. Such greases may be made in any degree of density and will have a melting point of 140 to 180 degrees Fahrenheit.

The tallow base greases are composed of a large per cent. of tallow combined with an alkali and brought to the desired density by means of vaseline, petrolatum or petroleum oils. Such greases, owing to their large content of tallow, are of low melting point, usually about 116 to 120 degrees Fahrenheit.

The high melting point greases usually require to be forced down between the journal surfaces by means of compression grease cups. The low melting point greases can often be packed in the journal box or directly on the bearing, as is the case in top rolls of spinning and twisting frames, and a low frictional heat will cause it to melt and change to an oil and lubricate the bearings.

The solid lubricants, such as graphite, soapstone, etc., have but a limited field of use, such as a filler or lubricant for fibrous piston rod packings, etc., although a certain form of graphite lately introduced has shown, in experimental laboratory tests, to have great lubricating value with low co-efficient of friction.

All the above is preliminary to a discussion of the subject matter of this paper, namely, Economical Lubrication.

Until recent years, this subject has been given but little thought and attention by those in charge of the operation of machinery, the prevailing idea being that as the cost of lubricants was such a small matter, as compared with that of other items, such as fuel, labor, etc., that many went on the theory that, "oil was cheaper than Babbit," and used plenty of it. But in these days of keen competition and close attention to operating costs it has been found that it is possible to lubricate machinery efficiently and at the same time, economically.

There are three essentials to be looked after in obtaining economical lubricating costs. First, to select such lubricants as will give good service as regards cool bearings, low friction, loss, etc. Second, to obtain such lubricants at the lowest market price. Third, to see that they are used economically.

The selection of proper lubricants depends, of course, upon the class of machinery on which they are to be used. If, on light running and high speed machinery, such as in the spinning, twisting and in other departments of textile mills, the light bodied or more fluid oils will give best results. For slow speed machinery, the heavier bodied oils will be better. For use on slow speed engines where the oil is fed from cups a heavy bodied oil should be used. For high speed work and engines where continuous oiling systems are in use, a light bodied oil should be used. Cylinder oils have for their base what is known, in the oil trade, as cylinder stock, of which there are two classes, the light colored or filtered stock and the dark or steam refined stock, the latter being almost universally used. This cylinder stock is high in flash test and viscosity, but of itself would not make a good steam cylinder lubricant, being a petroleum product, it has no affinity for moisture and will not stick to the wet cylinder and valve surfaces, so it is customary to compound this petroleum stock with a certain amount of fatty oil, usually tallow oil or neatsfoot oil in order that it will emulsify with the steam and cling to the surfaces. Where the steam is fairly dry, three to six per cent. is usually sufficient. Where the plant is small and the lubricating cost is a

small matter, a most satisfactory method of purchasing lubricants would be to buy of some reliable oil firm, but where the cost of lubrication runs into thousands of dolllars, as is the case with many corporations, and it is desired to obtain suitable lubricants at the lowest market price, the best plan to purchase on specifications, stating clearly just what is needed and awarding a contract for a year's supply to the lowest responsible bidder. Specification buying is fair both to the consumer and the dealer.

There are some oil companies however who are so far behind the times and wedded to ancient customs and methods of doing business as to decry the use of specifications, claiming that they are no indication of the lubricating value of an oil, etc. That this is not true is proven by the fact that there are many corporations today using specification oils with perfect success.

In fact some of the oil companies who have offered strenuous objections to the use of specification oils are themselves buying nearly all the supplies which they use in large quantities on specifications,—coal, lumber, steel, tin plate, paint, and many other things.

There are any number of good, reliable oil companies who are always willing to submit bids and will furnish first class lubricants at very reasonable prices.

Specifications are simply knowing what you want, and stating so on paper.

The usual physical tests for gravity, flash test, cold test and viscosity, and in the case of cylinder oils, a chemical analysis for percentage of fatty oil, which are very easily made, will give anyone who is familiar with lubricants a very close indication of the relative values of different oils. If one wishes to go further it is often possible to make actual service tests which will show absolutely any difference in the lubricating property of two or more oils.

The mechanical world owes much to the careful experiments into the theory of friction by such able men as General Morin, the late Prof. Robert H. Thurston, and especially so to those of the Secretary of this Association, Dr. Woodbury, and the information derived from such experiments has been of great value to engineers. The machines on which their tests were made, however, are not always available, but if it is desired to make a series of service tests, take a bearing that is running under constant load and speed, such as the main bearing of a high speed engine. Place a thermometer in the bearing so that the bulb rests on the shaft, and maintain a constant feed of oil. Have another thermometer placed somewhere in the room near the bearing and out of drafts, so as to show the temperature of the room.

Commence the test when the engine is started, note the rise of temperature at frequent intervals; also that of the room, continue the test until the temperature of the bearing ceases to rise. Every bearing will in the course of a few hours reach a point where the heat is radiated as fast as it is generated. Deducting the temperature of the room from that of the bearing will give the temperature due to friction.

If the engine runs in the daytime only, the bearing will cool off during the night, then the next day repeat the test with another oil. This data may be plotted on diagram paper so as to show in a graphical manner the different rises in temperature with various lubricants.

While it is no doubt true that in experimental work it has been found that the co-efficient of friction often decreases with rise of temperature, yet in everyday practice it is safe to assume that of two oils the one that will keep the bearing the coolest, is the best lubricant, so in tests of this kind the oil showing the least rise of temperature will be the better lubricant. Such tests can often be made in ring oiled bearings of motors, dynamos or shafting.

When making such tests it would be well, after finishing one test and before commencing another, to wash out the bearing with gasoline.

If it is desired to ascertain the lubricating value of two or more cylinder oils, take one oil and feed it at a given rate for a few days, then remove the cylinder head and wipe over the surface with a piece of soft white paper. If a good stain of oil is found it is evidence of good lubrication. If there is no stain of oil and a liberal amount has been used, it indicates either that the steam is very wet, or that not enough fatty oil has been used in compounding the lubricant.

This same test can be used to determine the least amount necessary to maintain good lubrication. By gradually reducing the oil feed and examining the surfaces from time to time the proper amount necessary to maintain good lubrication can be determined. Of course, where tests of this kind are to be made some means must be provided for easy removal of the cylinder heads.

Next to the question of buying, efficient and economical lubrication hinges on the methods of handling and applying the lubricant. Reliable appliances for feeding lubricants will save money. There are many ways by which every manufacturer can decrease his oil bill, notably by right methods of handling and using the lubricants. In many cases, too, by substitutig one lubricant for another and perhaps cheaper variety which will do the work just as effectively, a great reduction in cost can be made. For instance, I have found many cases where a high priced cylinder oil was used to lubricate general mill shafting and machinery where an ordinary machine oil or cylinder stock would have answered just as well and at half the cost.

It is simply a waste of money to fit engines with a continuous oiling system unless all necessary precautions are taken to recover the oil used. As an example I will say that several months ago I made an inspection of the mills of a corporation operating several large plants. At one mill where three large compound engines are in one engine room 80 to 1,000 gallons of engine oil were used per month, not a drop was saved, what didn't go down the sewer was lost in wiping up. I advised that they be equipped with a continuous oiling system

but at the same time I urged very strongly in my report on the importance of fitting the engines with pans and shields so as to prevent the loss of the oil. Instead of giving the contract to some responsible firm and holding them responsible for the result, they decided to have their own men do the work. The chief engineer, whose previous experience had been mostly on steam shovels and who was but little used to modern steam plant refinements, undertook the work and applied all in all his skill as a pipe-fitter on putting up the piping, filters, etc., but made such a bad job of fitting the engines with pans and shields that the loss of oil after completing the oiling system was as great as before.

On the other hand it is surprising how little new oil is really needed to make up the loss. As an instance I will say that at a certain plant in one of the suburbs of Boston, there are two vertical compound engines of several hundred horse power each, running at 125 revolutions per minute about eleven hours per day. The oil flows in streams over the bearings yet so well protected are they that a barrel or 50 gallons of oil lasts six months.

At another plant there are two single cylinder horizontal engines, about 24 inches by 48 inches, running at 100 revolutions per minute. Before being equipped with an oiling system these engines used about 200 gallons of oil per month at a cost of $50. After being equipped and means provided to prevent loss by leakage, etc., the monthly consumption was reduced to less than ten gallons. At the same time a change was made in the kind of oil used, which cost considerably less money, with the result that these same two engines are running right along month after month on a cost for engine oil of less than $1.50 per month.

A rather mysterious loss of engine oil was traced to a peculiar cause. While making an inspection of the plant of a client in Illinois, I found by the records that from 300 to 400 gallons of engine oil were required per month to make up the loss on two compound engines. The engines were fitted with a continuous oiling system with excellent facilities for preventing loss. The cranks, eccentrics and cross heads being cased in to prevent the oil being thrown out. The oil was used freely on the cross head pins and guides, and under the piston and stuffing boxes and between the cylinder heads and the end of the bottom guide there was quite a large cavity or depression in the casting. From the bottom of this was a drip pipe but the engineer kept it closed, allowing the cavity to fill with oil, which when the cross head went out allowed the oil to flow along the bottom guide. The cross head shoe on the return stroke splashed the oil up against the hot cylinder head. As they were using steam in the high pressure cylinders at 150 pounds per square inch there was sufficient heat to burn the oil which was indicated by the cloud of smoke continually coming out of the cross head barrel. At my suggestion the engineer allowed this oil to drain into a tank with the result that this cause of loss was stopped.

Besides what was lost from this cause it was found that the oil soaked waste used in wiping up was sent to the boiler room to be burnt. The installation of an oil and waste saving machine stopped this loss.

Another cause for loss often occurs in wiping up with waste. The oily waste then goes to the boiler room to be burned. In wiping up around engines it has been found by experiment that a pound of dry waste will, after being used and squeezed out by hand, weigh two pounds, or, as the writer found at one plant, there was a loss of one gallon of oil for every ten pounds of dry waste used, this in itself is quite an item. In most large plants it will pay to install some make of oil and waste saving machine, by means of which the oil is extracted and filtered and the waste washed, dried and used over again.

To give an idea of what this loss sometimes amounts to, the writer, while inspecting lubricating conditions at the mill of a client, found, on inquiry, that they were using waste at the rate of twenty-eight thousand pounds a year. Most of this waste was used for wiping up around the engines and machinery on which a great deal of oil was used. All of it was sent to the boiler room to be burned. As the waste was heavy with oil, it is safe to say that at the very least, two thousand gallons of oil, together with the waste, were lost per annum.

Receiving, storing and distributing lubricants are other important factors in economical lubrication. If the plant is a large one where several thousand gallons of oil are used per year, it will pay to provide storage capacity so that the oils can be bought in tank car lots. In this way there will be a reduction in the price and also a saving in the amount of labor required to handle the oil.

But if it be a small plant where only a few barrels of each kind of oil are used per month, the oil should be kept in tanks so arranged that the barrels can be emptied into them by gravity. Care should be taken to see that the barrels drain out thoroughly. As the empty barrels are worth seventy-five cents to a dollar or more each, they are worth saving and should be kept in a cool place to prevent shrinking until enough have accumulated to make a carload. When sold, the amount received should be credited to the lubricant account.

It is customary in a large plant to have some one in charge of the oil house, to receive and store the lubricants, and issue or deliver them to the various engine rooms and departments, keeping a record of the amounts issued in a book or on a blank form provided for this purpose. This is quite as important in a small plant and can be done without great effort or expense.

In one plant the various departments are provided with cans or small tanks of size sufficient to hold a few days' supply. The name of the rooms or departments to which the cans belong are stamped on strips of sheet brass soldered upon the cans. Leaky cans or cans with broken spouts tend to wastefulness, the repair man should periodically gather up all such cans and repair damages or fit new spouts before returning the cans.

No oil should be issued except on a requisition signed by the chief engineer, master mechanic or

department foreman. In one small plant where the amount used does not warrant keeping a man especially to look after the lubricants, the oil house is placed in charge of the general storekeeper, and opened only at certain times, half an hour or so in the morning and the same time in the afternoon. The men come or send for their supply of oil at these times. At all other times the oil house is kept locked.

At the end of the month the amounts of lubricants issued should be totaled up and entered on a blank. The totals when multiplied by their price per gallon or pound will show the cost of each kind of lubricant used and also the amount used in each engine room and department and their cost. By comparing reports month by month it can be seen whether the cost is increasing or decreasing and in what departments the differences have taken place.

By dividing the total cost by some unit of product or output, such as tons, pounds, yards, kilowatt hours or whatever it may be, the cost of output can be determined and entered on the report sheet. There should also be a place to enter the amounts of oil purchased during the month, the number of empty barrels sold and the amount received for them. Thus a complete record of the lubricant cost can be kept on one sheet.

Considerable saving can often be effected by reducing to as few as possible the number of different kinds of lubricants. Many persons in charge of machinery have an idea that they must have some certain brand of oil, and that they will have all kinds of trouble if they should attempt to use anything else. In a factory the writer found that in one department the foreman insisted on having a special brand of oil, the price of which was such that it was costing $1.17 per machine per month. (There were more than one hundred machines in operation in his department.) At all the other plants belonging to the same company this same make of machines was costing less than half that amount per machine per month for lubrication.

At the mills of a certain company where the writer had been engaged to reorganize the lubricating practice, it was found that nine different brands of cylinder oil, five brands of machine oil and a dozen or more different kinds or grades of greases were in use. Some were fairly reasonable in price, others inordinately high. In one engine room, the engineers had to have a certain kind of oil, in other engine rooms in the same building the engineers couldn't use this oil at all, but had to have something else. In the electric power house still another brand was called for, and the men in the pump house had to have something else. Each of the four brands had a different price. Analyses and practical tests showed that they were all of good quality, but no one better than another.

A few plain common sense tests and demonstrations soon convinced the men of the fallacy of their notions, and after that one grade of cylinder oil and two grades of engine and machine oil answered every need. As to greases, it was soon shown that three kinds or grades would answer every requirement.

In regard to the lubrication of textile machinery, as there are such a great variety of machines and as they are operated under such varying conditions, it would be impossible to make any hard and fast rule as to the lubricants to use except that it might be said that for the heavier and slow speed machinery, a heavy bodied oil or soft grease and more fluid oils for the high speed machinery, and for spindle bases, an oil of very light viscosity.

The main thing in regard to economical use of lubricants in the manufacturing departments of a textile mill is to train the hands to be careful in their use of the oil, a matter which requires constant attention on the part of the overseers.

Foreign Markets for Cotton Textiles.

C. A. GREEN, 290 Broadway, New York City.

There has been much controversy over the best methods for securing trade in foreign countries. Some will tell you, the only way is to place the selling of your goods abroad in the hands of the export commission house, because they have been dealing in certain markets many years. Others that you can only succeed by placing your agency with some local house, their own, of course, being the best for the purpose. Again you should tie up with some manufacturer's agent, who will very likely tell you he can sell all the trade, if you will give him a commission on all sales from his country, and a liberal sum for expenses.

Now, each of these plans have some advantages, and disadvantages, also. The export commission house is an important factor in the trade, and has done much for the upbuilding of American commerce, they have their place, and cannot be overlooked, they are a convenience to both buyer and seller.

The local house that takes an agency in good faith is also a valuable aid in securing trade, providing always, that the good faith is assured. Arrangements of this kind are frequently made with little or no knowledge of the party, the manufacturer overlooking the fact, that his own reputation in that market depends very largely on the character, standing and reputation of the house that represents him.

Such agencies should never be given except after a careful investigation has been made, not only as to financial responsibility, but facilities to handle goods. I have known of cases where agencies for American lines have been taken for the sole purpose of bottling them up, and keeping them out of the market as competitors of similar goods already introduced from some other country, and sometimes handled by the same house.

I do not wish to convey the impression that there are not thoroughly trustworthy agents to be found in foreign markets, for there are just as good people to trade with outside the United States as in it. We have no monopoly of commercial morality, but I do wish to impress the fact that the same care and caution should be exercised in the foreign trade, as in the domestic, and the means of protection made use of.

The manufacturer's agent, as a rule, is ready to take on any line, as I have met him, it does not

seem to matter whether he has any knowledge of the goods or not. He is usually willing to handle anything from locomotives to piece goods.

Good use can, however, be made of all the methods of making sales, after one has secured proper information in regard to the needs, requirements and conditions of the various markets.

The most effective way to do this, is, as I have mentioned before, by personal investigation. Go yourself, or send your best man, not of necessity your most efficient domestic salesman, but your most observant and diplomatic man. Then be persistent. It sounds well to shout "trade follows the flag," but it is more practical to realize the trade follows persistent effort.

My own investigations lead me to believe that our manufacturers can meet all the conditions of foreign trade if they earnestly set about it (not that we can sell all lines in all markets).

One of the great obstacles in the way of our more rapid advance abroad has been our adherence to the antiquated system of cash in advance; it is safe, to be sure, but not in accord with the modern science of business. None questions the importance of credit in domestic trade, yet for the foreign they will say, "we must have the cash before we let the goods out of our hands." Cash is certainly very desirable, and you can get it, if, you have something to sell that the foreign buyer must have, and cannot get elsewhere. This attitude of the American manufacturers towards the foreign merchant is commented upon all over the world, and loses to us millions of trade annually.

Without credit the present business of the world could not be transacted, not all the gold taken from the earth could perform its service. It constructs railways, and steamships, open mines, improves farms, builds houses, factories and cotton mills. It has been called the "Soul of Commerce." It is estimated that from 90 to 95 per cent. of the world's business is transacted on credit; yet we have been trying to extend our foreign trade with little attention to this important factor.

It is a matter worthy of the most serious consideration of our business men. We know that the manufacturers of Europe have built up their trade by systematic work, and fair treatment in regard to selling terms. Why should we not do the same?

We, as a nation, are seeking to enter the markets of the world, and if we are to secure any large portion of the trade, and it is the large portion we should have in mind, we must be willing to treat the reliable merchants in these markets, with the same consideration that the same class receive in the domestic trade.

It is sometimes said that it is impossible to meet the credit terms of our European competitors. With this I do not agree; it may not be desirable, or wise, to make as long terms as those given by some European concerns, but it is possible for us to meet the reasonable requirements of the trade.

As accurate, and as prompt, credit information is obtainable here as there, and the American credit man is as competent to decide from the facts at hand, but still many look with fear and trembling at the question of credits outside of the United States.

It is quite possible that the majority of the manufacturers and selling agents of textiles have been so absorbed with domestic conditions, that they do not realize the importance of work that has been quietly going on for the past few years which makes it possible for them to trade with the world with safety. They may not be aware of the fact that the Mercantile Agency, R. G. Dun & Company have planted their branches (sixty-eight are now in operation outside of the United States) and established their connections in all the commercial centers of the world, or that through these branches and connections, the same detailed information in regard to foreign merchants is obtained, that they are accustomed to base their action on in the home trade, if the required data does not happen to be on file in New York, it is only a question of mail or cable.

The proper use of these facilities, and the improved banking arrangements under which drafts on merchants in any part of the world may be easily handled, make it possible for our manufacturers to stand on an equal footing with those of Europe, in spite of their being longer in the field.

The extension of credit is not advisable, however, in countries where speculative conditions render high rates of interest necessary. There are markets enough where trade conditions are as normal, and credits as safe, as they are here at home, and it is in these markets, that we should seek to extend our trade, by legitimate extension of credit on safe and conservative lines.

Success in the foreign field then becomes a simple problem of salesmanship. The same care and attention that brings success at home, will accomplish the same result abroad.

Part Time Instruction for the Textile Industry.

W. H. DOOLEY, Principal Lawrence Industrial School, Lawrence, Mass.

A few years ago a commission was appointed by the state of Massachusetts to investigate the needs of industrial education throughout the state. The textile industry as a whole is the most important industry in this state and its importance in its relation to industrial conditions will be appreciated when it is observed that the industry gave employment to 32.5 per cent. of wage earners reported for all manufacturing industries. Naturally this commission first studied the need of industrial education in the textile centers.

In the course of their investigation of the conditions of employment of children between fourteen and sixteen years, they found that, "universally five-sixths of the children in the mills have not graduated from the grammar schools, and a very large proportion have not completed the seventh grade, while practically none of the children had a high school training. . . . The appreciation of education is not of a low grade. Forty per cent. of these families have shown a decided interest in a school which would give their children wage earning powers, and have declared they

wanted their children to remain in school, and what is more tragic, sixty-six per cent. of them could have kept them there."

The law compels children to remain in school till they are fourteen years of age and under ordinary conditions they should have completed the grammar school at the age of fourteen or thereabout. The question that comes to one's mind is. Why has not this child completed the grammar school before going to work? In observing a school of boys, no one can fail to note that a portion of them seem to develop literary ability and another portion develop a positive dislike for books and study and are an annoyance to the teacher. They desire to work with their hands and are mechanically inclined. They have passed the period where they can study for five hours a day. As the result of unsatisfactory scholarship they repeat their work year after year until they are fourteen, when they leave school.

They seek employment and find it readily in the mills performing the simple and easy operations of doffers, piecers, bobbin boys, etc. These operations can only be performed to great advantage by children between fourteen and eighteen years. So that we might say these branches of the industry are absolutely dependent upon the maintenance of a supply of labor of the ages affected from fourteen to eighteen years. It is from the ranks of such labor that the industry draws its most skilled spinners, weavers and other high class help of mature years, who later become second hands and overseers. The supply of such native help is rapidly decreasing.

These children have left school at a very tender age, a time when they had little liking for school or interest in the subjects they learned there. They have received absolutely no industrial training for the work they are going to do. The industrial operations of mill and shop of today are so highly specialized that the operators are not obliged to exercise any of the training they have received in school. The result is that they rapidly lose the habit of thinking and the power of initiative and when they reach the age of eighteen, and cannot any longer perform the operation of doffing, etc., on account of the stiffness of fingers they become dissatisfied and leave the mill and form the army of the unskilled. Not only that, but when an opportunity presents itself for a position of responsibility, we find our American young people not able to fill the position and it is filled by a skilled workman from Europe who has received either a part time or a complete training during the years of fourteen and eighteen, while they were working in the mills.

Statistics from evening schools show that very few young people working in the mill between fourteen and eighteen years attend evening schools. This is not surprising. They are tired after a hard day's work and can only be aroused by play, and naturally seek the companionship of boys their own age on the street corner, gymnasium, etc. The course of study of an evening school is not such as to attract, interest and recreate tired children. Their eyes wearied with long labor in the day cannot endure the fatigue of much book work by night. Physicians have confirmed this experience by stating that growing children working days should play after supper and retire early.

Therefore, we are confronted with a great educational problem due to the employment of children between fourteen and eighteen years in industries under conditions where there is absolutely no opportunity for them to receive an education. While existing public schools offer opportunities for general education, preparatory for college and higher technical schools and evening classes for adults and those academically inclined, they offer no training for the great majority of children who are obliged to leave school at fourteen and enter industrial life.

Hence the need of some kind of a part time or continuation school, to continue the instruction of children who have left the regular day school, so as to conserve and increase the knowledge they have learned, and help them in applying that knowledge to meet their every day needs.

This kind of education may be advocated for two reasons: first, to make our nation a strong manufacturing country full of skilled workmen and thereby gain the manufacturing supremacy of the world; second, to equip young people with a training to find out their aptitude and then allow them to specialize and in this way to be able to battle life more effectively.

There is no antagonism between these two reasons, each is excellent in its own way; but my heart and sympathies lead me to attach more significance to the latter reason.

European nations, especially England and Continental nations of Europe, recognized the need of part-time schools long ago. As early as 1833 the half-time system was introduced into England by her Commission on the employment of young persons in factories. This was introduced to prevent over-work and also to prevent under education, by requiring three hours attendance in school each day. To show how successful part time instruction is, the late Commission on Technical Education in England stated that "half-time children of the great manufacturing towns in Keighley, Eng., numbering from 1,500 to 2,000, although they receive less than fourteen hours of instruction per week, and are required to attend the factory for twenty-eight hours in addition, yet obtain at the examination a higher percentage of passes than the average of children throughout the whole country receiving double the amount of schooling." Similar experiences in other parts of England, Germany and America show that the long-time system (all day schooling) and the omission of industrial work, are in violation of the laws of physiology.

The heart of German's system of industrial education is the part-time or continuation school. Their system of education is more complete than our own. They act on the principle, admitted by everyone who knows or cares anything about education that the way to secure a good training for the boy is not to end his school life as soon as he goes to work, at fourteen, but to insist that he shall spend from eight to twelve hours a week, until he is eighteen, in a continuation school. This system of instruction is slower, more thor-

ough, and assimilated better than it can be under our American system of hurrying children through school until they reach fourteen, and then cutting instruction short. In certain industrial sections of Germany, Saxony, Bavaria, its employers of labor in both mills and shops are obliged to allow their young workers between the ages of fourteen and eighteen from nine to twelve hours a week to attend the continuation school. The weekly period of instruction is divided something as follows: Three hours on Saturday morning from 9 to 12 o'clock, and three hours each on two working days, from 9 to 12 o'clock in the morning, or from 4 to 7 in the afternoon. By this arrangement of hours, as well as in assignment of the individual classes to different week days, it is possible to make a suitable change in school attendance in the interest of the mill and workshop management. No instruction is given after 7 p. m.

The course of study for mill workers consists of instruction in mill arithmetic and bookkeeping, correspondence, civics and duties of citizenship, study of raw materials and the processes they pass through in the mill, and mechanics and chemistry underlying the mill operations.

The German mill manufacturers and overseers did not take kindly to this part time instruction at first. They had an idea that their organization would be disrupted, that discipline could not be maintained; but the scheme was put into operation, the young people left the mill to go to school in a very orderly way and the mill managers are highly pleased with the results obtained. The importance of this kind of textile education cannot be too highly estimated. It is the main pillar by which the German textile industry maintains its competitive power in the foreign trade. Cheapness of labor is not sufficient to attain this end, they must be educated or their work in the end will cost more than that of more expensive hands who possess high skill and thorough understanding of their trade.

The solution of the problem of a part-time education, or co-operative plan between the school and the manufacturers was first worked out in this country by Prof. Herman Schneider, of the University of Cincinnati, who more than ten years ago saw the need of closer co-operation between the shops of the city and university, whereby the shop takes charge of the practical training of the students, and the university teaches the theory.

By this method the university is relieved of the necessity of equipping its laboratories with expensive machinery, which in the course of ten or fifteen years may become obsolete, and the students are getting a practical training such as no school could possibly furnish. They are working in commercially operated plants, the hum of industry is on every hand, and push and go are necessary in order to hold one's place in the shop organization.

The scheme in detail is as follows: Students taking the co-operative engineering course are divided into two sections which alternate with each other, one section at the shops for a week while the other section is at the university. During the summer students work full time at the shops, but are given several weeks' vacation; there is also a week's vacation at Christmas. The practical work at the shops is as carefully planned as the theoretical work at the university, and in all cases the students follow as nearly as possible, the paths of the machines manufactured from the raw material to the finished product. For instance, a student in electrical engineering spends the first year in the foundry; the next year and a half in the machine shop; the next two years in the commutator, controller, winding, erecting, and testing departments, and the subsequent time in the drafting rooms and sales offices.

A contract is signed by the student, the university, and the firm. This contract has a blank space to be filled out with the shop work the student is to receive during the six years of the course. In all cases the dean of the engineering college, and the professor of electrical, mechanical or chemical engineering, as the case may be, confer with the manufacturers in planning this course of shop work, so that the students get a logically and carefully arranged shop and business training.

Students are paid for services while at the shops at 10 cents an hour for the first period, with an advance of a cent per hour for each of the eleven succeeding periods.

Each year is divided into two periods of approximately 990 hours.

The total earnings for the shop work approximate $1,800 for the six years. The university expenses for tuition and laboratory fees are $90 the first year, $80 for the second, and $65 for each of the four following years, a total of $430.

A student earns more than his tuition by $1,330.

Students who desire to enter this course are required to begin work in the shops on or about the first of July, preceding their entrance to the university. Their admission to this course in September is in a measure dependent upon the character of work they do during the probationary period from July 1 until the college opens.

Like all new movements it has a great many obstacles in its path. It has been in existence long enough to know something about its success. Professor Schneider says it works smoothly from year to year. During the recent industrial depression these courses have been in operation to the satisfaction of all concerned. There are other part-time systems of education in existence, particularly at Fitchburg, Beverly, Mass., and the Lawrence Industrial School.

The Fitchburg plan was first conceived by Daniel Simonds, president of the Simonds Manufacturing Company, and several other Fitchburg manufacturers. At a meeting in New York when Professor Schneider explained his system, they were all impressed with the simplicity and practicability of the plan, and wondered why such a scheme could not be adopted to highschool students who wished to learn a trade and continue their education at the same time.

A committee was appointed from the different manufacturers to consider the advisability of such a plan in the local high school. They reported a plan for a combination shop and school course, offering the use of their shops for the practical instruction of apprentices if the school would provide the necessary academic instruction. The school committee agreed to this plan and the fol-

lowing manufacturers entered into the agreement:

The Simonds Manufacturing Company (manufacturers of ball bearings); Fitchburg Steam Engine Company (manufacturers of steam engines); The Bath Grinder Company (manufacturers of grinding machinery); The Blake Steam, Pump and Condenser Company (manufacturers of pumping and machinery); The Cowdrey Machine Company (manufacturers of special and wood-working machinery); The Putnam Machine Company (manufacturers of lathes, planes, railroad tools and general machinery), and The Fitchburg Machine Company (manufacturers of lathes).

The course outlined is of four years' duration. the same as the regular high school course. The first year is spent wholly in the school, and the next three years in the shop and school—one week in the shop, and one week in the school. In order to carry out this scheme the manufacturers take boys in pairs so that by alternating they have one of the pair always at work, and likewise the school is provided with one of the pair.

The Fitchburg scheme of industrial education was put into operation August 1, 1908, with twenty-two people, eleven in the shop and eleven in the school.

The parents agree that the boy will stay at this work for three years, and the manufacturer on his part agrees to teach him the various branches of the trade designated in the agreement. In order to make this binding the parents must file a bond of $50.

Each Saturday morning the boy who has been at school that week goes to the shop in order to get hold of the job his mate is working on, and and be ready to take it up Monday morning when the shop boy goes to school for a week. When there is a vacation week in school, work is provided in the shop, so that the boy does not loaf around the streets.

The shop work consists of instructions in the operation of lathes, planes, drilling machines, bench and floor work and other machine work.

The school work is twenty weeks a year. Since it is such a short course only such subjects as are of practical value to the student in the pursuit of a livelihood are taught. The regular courses of high school study were discarded, precedent ignored, and a new course of study made out.

In the Lawrence Industrial School some of the boys taking the regular textile course have secured work in the mills in the afternoon while they attend school in the morning. The same has been done in the mechanical department. These courses have been described in a former paper.

Why cannot a similar scheme of education be worked out for the textile industry. Of course I realize that the machine shop organization is such that it is necessary for a machinist to know a number of operations, to use lathes, drills, etc., while the mill is conducted on the plan of a factory where each person performs one operation only. But the textile industry has for years made successful application of technical school learning. So in this respect it is different from the shoe and other factory industries. Enough has been said to show that a part time system is necessary in our textile centers chiefly for protection of children against excessive manual work, and also to serve for protection against too much as well as too little mental work. It may be carried out either on the German or English plan of ten or twelve hours a week instruction or the plan of working in pairs, one boy at work in the mill while his mate is at school as has been worked out at Ludlow, Mass., or school instruction part of the day, as in the Lawrence Industrial School.

Of course it must be borne in mind that the methods of instruction in these part time schools must be quite different from those in the existing public school. In the regular schools they teach in a very logical manner, beginning with the simple abstract principles. That is one reason why children who are mechanically inclined leave before completing the grammar school. Their mind is of a concrete order and the principles underlying arithmetic, languages, mechanics, etc., must be presented in shop and mill terms to arouse their interest and in order for them to see the value of the same. This type of mind is shown in the average mill worker who frowns on the theoretical or abstract side of his work. Wherever it has been tried and properly administered it has been successful.

The Commonwealth of Massachusetts has passed a law allowing communities to establish part time instruction, and in order to encourage the same, aids to the extent of one half the cost of maintenance.

Moisture in Cotton.

Russell W. Moore, M. Sc., 340 Hudson St., New York City.

The subject of moisture in cotton derives practically all of its importance from the fact that the quantity of moisture is a verying amount. Raw cotton can absorb very nearly 30 per cent. of moisture and cotton fabrics can contain as much as 25 per cent. by use of hygroscopic dressings and damp storage without communicating a damp feeling to the goods. From reports already made to this Association the excess of moisture in raw cotton over what is considered the normal quantity can, in a number of bales taken at random, amount to over 40 pounds in a bale and doubtless even this high figure is exceeded. It is therefore of the highest importance that a standard should be determined and established to definitely fix the amount of moisture to be considered as normal to raw cotton and any excess should be held to be abnormal and valueless. This standard has already been determined and placed at a regain of 8 1/2 per cent., that is, absolutely dry cotton plus 8 1/2 per cent. of water. It is not to be understood that cotton with the normal per cent. of water contains 8 1/2 per cent. of water, but that when deprived of its water, it will absorb under natural conditions as nearly as it is possible to estimate the varying conditions which cotton experiences, 8 1/2 per cent. of moisture.

The result of this absorption is 108 1/2 pounds of cotton containing moisture, which 108 1/2 pounds contains 8 1/2 pounds of moisture, or 7.834 per cent. of the whole amount.

CONDITIONING.

This term is applied to a process that has for its aim to determine the weight of a sample or parcel of textile material when containing the normal amount of water for that material. It is accomplished by determining the amount of moisture present in the sample and adding the standard regain. It is the process well known to all chemists of drying a sample to constant weight. The process has the same object in view when used in various textile fibers and differs only in the manner of applying the necessary heat and the temperature employed. The modern method of drying textile fibers for conditioning purposes consists in passing a current of air at the proper temperature through the sample until it ceases to lose weight. The loss in weight is the moisture. From numerous experiments the proper time for drying is ascertained and this time is observed in making conditioning tests. Thus numerous tests can be rapidly made and the results obtained according to a definite and readily understood rule. Cotton is dried at 100° C., or 212° F., the boiling point of water in England, but the continental conditioning houses make use of a slightly higher temperature, 105° to 110° C.

When cotton has lost its moisture it very soon regains it from the air, hence it is essential to ascertain the final dry weight at the temperature at which the moisture has been expelled. This is effected in conditioning ovens by stopping the current of heated air and rapidly weighing the sample without removing it from the oven. In practice three lots are made of each sample, two of which are conditioned. When the results of loss of moisture are within one-half of one per cent., they are considered satisfactory; if a greater difference is shown, the third lot is tested. If the difference between the three lots is less than one per cent., the average of the three losses in moisture is taken as final. A greater variation is rarely met with and shows a very uneven condition of the bale.

To the absolutely dry weight thus obtained, the standard regain is added in the case of cotton 8 1/2 per cent., and in the case of silk 11 per cent. This gives the conditioned weight and by an easy calculation the conditioned weight of the bale is obtained.

SAMPLING.

Second only in importance to proper means of drying is the sampling of cotton and other textiles for conditioning purposes. The sample tested should truly represent the bale and a sufficient number of bales should be sampled to truly represent the lot, for it can readily be seen that an improper sample would yield misleading results no matter how carefully and accurately the test is applied. By weighing the bale and drawing the samples from all parts of the bale a correct result can be obtained. The theoretically correct method is to cut several wedges extending from the outside to the middle of the bale. The accuracy of this method has been demonstrated in sampling wood pulp and the principle is the same when applied to cotton. As to what is a practical method for general use in the United States is a matter for consideration.

At Manchester the practice is to take samples of about three pounds and in no case less than one pound. For ten bales the entire sample should weigh about five pounds.

VALUE OF CONDITIONED WEIGHT.

The value of conditioning lies in the fact that it is a definite weight and not subject to variations from any moist or dry surroundings subsequently experienced by the bale. As to the value of conditioned weight in this country, there is no question in the silk industry, while in Europe its use is practically general. A steady growth in its use has been noted in the United States and tests have been by no means exclusively confined to the silk industry. It is applicable to cotton, silk, wool, wood-pulp, paper, jute, hemp, flax and any other textile fiber. Without proper conditioning a variable and to some extent useless material is included in goods that are bought and sold by the pound, and a variable pound is no more a pound than a variable dollar is the right kind of a dollar.

There is no desire to advertise or to exploit the facilities for testing of the United States Conditioning and Testing Company at New York; attention is simply directed to the fact that the silk industry have recognized the necessity of conditioning and have provided themselves with the proper means and apparatus to test silk. The same means are available for other textile industries and it is confidently hoped that they will make use of them.

The fundamental principle of conditioning all textile fibers is the same—determining the loss of moisture. The regain as applied to each fiber is a matter of agreement and convention, and as far as the regains have been established, they are recognized generally to be fair and just.

An idea of the variations of textile fibers may be derived from an inspection of the regain standards of the Conditioning House of Bradford, Eng., which are as follows:

	%
Tops combed with oil	19
Tops combed without oil	18¼
Noils	14
Worsted yarns	18¼
Cotton and cotton yarns	8½
Silk	11
Scoured wool	16

These are generally accepted by all conditioning houses, and may be considered as sole standards.

Further standards for regain in moisture are:

	%
Flax and hemp	12
Tow yarn	12½
Jute	13¾
Wood-pulp	10

A recent decision by the Board of United States General Appraisers adopted the conditioned size of a disputed Schappe yarn as the correct basis for the assessment of duty, and it is

only a question of a short time when this method will be generally followed by the Custom House in cases where differences arise between the invoiced character of such goods and the examinations made by the Custom authorities. In no other way can uniform classifications be made. This was clearly recognized in the decision, and was followed in spite of the fact that it affirmed the lower rate of duty. Sooner or later the best method in any line will prevail. Slowly but surely estimates of individuals are ignored when definite figures are available by accurate and certain processes. The United States Steel Company is a success because everything it handles in the way of raw material and everything it sells can be controlled by accurate chemical analysis.

The textile industry that makes the most extended use of scientific methods and scientific control of all of its processes will first attain the success that follows earnest effort using the best means.

Illumination as a Factor in Manufacturing Costs.

By A. S. HUBBARD, New York City.

Henry L. Gantt, the well known expert on manufacturing costs, says in a recent article that in two ways only can profits be increased, viz., either by raising the selling price, or decreasing the cost of production. He then points out the efforts that have been made and the limitations controlling the former method, and calls attention to the very important fact that the latter method has been comparatively little studied.

There are doubtless few manufacturers who will accept this statement off-hand. As a general rule, the manufacturer is ready to replace old machintry and devices with improved forms as soon as their value is proven, and gives what he considers a large amount of consideration to the "labor problem," and to other conditions affecting the cost of production. The fact remains, nevertheless, that there are few cases in which the question has been subjected to those rigid and painstaking processes of analysis with which the scientific investigator is accustomed to work. The mere fact of using the most modern and improved machinery, of providing a factory that is reasonably spacious, clean and well ventilated, and securing labor at the cheapest market price, is by no means a guarantee that the cost of production is at the minimum, or even appropriating it. The one missing but important link in the chain is the neglect to consider the efficiency of the human machine, which after all is the determining factor in final costs. The item of wages is becoming a more and more serious matter with the constant increase in their rate and difficulty of securing skill and faithfulness; so that, of all the machinery and facilities employed, it will be readily conceded that the operative is the most important machine of all. Anything that interferes with the proper working of the human machine must therefore show itself in an unduly large cost of production. The day has happily long passed when human beings were classed among what the textbooks call "prime movers." The steam engine and the water-wheel have replaced the human muscles as mere sources of power. The muscular force demanded by textile operatives is a trifling matter.

The three important elements of the human machine are the brain, the eyes, and the fingers. The eyes perceive, the brain directs, and the fingers execute. Ocular perception is the first and one controlling act upon which the final results of the human mechanism absolutely depend. To enable the eye to perform its function with the greatest possible ease and accuracy is therefore of first importance in any consideration of the conditions determining operative efficiency. To prove an illumination, both natural and artificial, that shall secure this end is therefore a problem worthy of the most serious study.

The adequacy or efficiency of any system of illumination must be judged by the extent to which it enables the eye to perform its functions without undue strain and effort. This fact cannot be too strongly emphasized, especially in view of the prominence that has recently been given to the mechanical efficiency of artificial lighting installations. The amount of illumination produced on a given surface from a watt of electric current, or 1,000 cubic feet of gas, is of some interest and importance, but its importance is wholly secondary to that of the efficiency of the human machine in relation to the illumination by which it operates. Compared with the cost of labor and the value of the product turned out, the cost of producing artificial light is so insignificant a factor as to make its serious consideration ridiculous. A simple reckoning will make this point clear.

We may assume that the cotton mill of today is suplied with electric current from its own generating plant, and that therefore the cost of such current, exclusive of fixed charges, which remain practically the same whether much or little current is used for light, will not exceed one cent per kilowatt hour. One kilowatt, or 1,000 watts, for one hour is equivalent to 100 watts for 10 hours. One hundred watts of current will supply two ordinary 16 candle power electric lamps, or one 80 candle power tungsten lamp, or more than one-fifth of an arc lamp, or more than one-fourth of a Cooper Hewitt lamp.

One cent will therefore pay for the illumination produced by one of these sources for an entire day of ten hours. In other words, if every operative were given two carbon filament lamps or one tungsten lamp for his own exclusive use, or one arc lamp was provided for each five operatives, or one Cooper Hewitt lamp for each four operatives, the cost of current for the entire day would only be one cent for each operative. Suppose the average wages of the operative to be $2.00 per day of ten hours, to make reckoning easy. This is twenty cents per hour, or one cent for three minutes; therefore, an operative would have to lose but three minutes time to represent a money loss equal to the cost of more light than he would need for an entire ten hour day. How much of an imperfection or curtailing of product would it take to represent one cent? Surely this is a convincing case of the riductio ad absurdum method of argument.

Of course, we must add to the cost of current the cost of upkeep of the lighting installation, including depreciation, maintenance, etc.; but this will certainly not exceed the cost of current, and we can double our figures for the cost of light without any material effect upon our argument.

The question whether ws use ont-half a watt or two wattts per square foot of floor area, or whether a lamp costs 50 cents or $50., is a trifling matter, when the whole cost of production is considered compared to the question of the efficiency of the human machines upon which the product of the mechanical equipment depends. Any discussion of the lighting problem which fails to take this into account is fatally superficial and misleading.

The operative in the cotton mill has two general objects of vision, viz., the material being handled, and the machine which is handling it. That illumination will be the best which enables the eye to follow both of these objects, as occasion may require, with the greatest ease and distinctness.

There are certain general conditions which must be observed for all uses of the eye, and other special conditions which pertain to particular occupations or uses of the eye; both of these must be duly considered in the choice of a luminant and the layout of a lighting installation.

The general relation of light to the eye must as they are commonly recognized in practice. These are: the proper intensity, which is the happy medium between dimness and dazzling brilliancy; absence of glare, that is, absence of brilliant light-sources in the line vision; steadiness, absence of flickering or wavering or light and dark spots on the illuminated surface; and freedom from injurious invisible radiations It will be noted that, with one exception, all of these qualifications are negative, that is, they consist in the absence of injurious effects rather than the presence of qualities that are beneficial.

The gtneral relation of light to the eye must necessarily be understood before the general requirements for satisfactory illumination can be determined. The eye is the most complicated single organ of the body, and the exact purpose and function of all its different parts are not even yet fully understood. We have enough positive knowledge, however, to afford a safe guide for its general use.

The eye consists of two sets of parts, one set of which makes up an optical instrument very similar to the photographic camera; the other is made up of an exceedingly delicate and complicated arrangement of muscles, nerves, and brain cells, which convert the photographic image into the mental impression called vision, or seeing. Defects in the physical, or instrumental part of the eye are often corrected with glasses, or by surgical operations, or both; injuries or strains of the physiological part are vastly more difficult to treat, and more far-reaching in their effects. The physiological part of the eye is subject to muscular, nerve, and brain fatigue, in any of which, if the fatigue be unduly severe or prolonged, inflammation and pain will result; and if these be sufficiently acute or prolonged, permanent injury will follow.

The optic nerves, with their brain centres, are not only important physical organs themselves, but are so closely connected with other nerve systems of the body that it is impossible for them to suffer without the other nerve systems being affected sympathetically. Particularly close is this relation between the optic nerves and those of the digestive organs. It is not uncommon for sudden exposure to brilliant light, such as clear sunlight, to produce nausea and headache of precisely the same symptoms as would result from indigestion. It is also a well established fact that the color of light has a strong influence upon the general mental condition, producing either depression or elation of spirits. Thus red produces excitement, activity; yellow may be considered neutral, the yellow rays being the most effective in producing the simple visual sensation; green is distinctly restful, giving a sense of peace with a suggestion of coolness; blue and violet are depressing, as the common phrase, "feeling blue," bears evidence.

This connection of vision with other functions of the body must by no means be dismissed as a mere academic question for the consideration of scientists; it has a direct and positive bearing upon the efficiency of the human machine, for the one essential difference between the human machine and the purely mechanical device is its possession of a brain upon whose action the operation of the machine is absolutely dependent. Put the brain out of commission, as by sleeping, or an anesthetic, or mechanical injury, and the human machine becomes a perfectly inert mass. To work at its maximum efficiency, it must not only have fuel in the shape of food to supply the motive power, but the brain must be in such a condition that it will direct the machine with the utmost accuracy and co-ordination. To illustrate with plain examples; no one can do his best work when he is suffering pain, when he is tired, or when his mind is distracted by troubles or emotions. A happy frame of mind is just as essential to the full efficiency of the human machine as lubricated bearings and properly adjusted parts are to the mechanical contrivance.

At the conclusion of Mr. Hubbard's paper the usual discussion was invited and J. S Codman of Boston said:

The writer of the paper which has just been read evidently belongs to one of those progressive manufacturers of lighting appliances, who believe that it will be for their ultimate commercial advantage to bring to public attention, as often and as forcefully as possible, the fundamental principles of good illumination. The interests which I represent have given every evidence that they also believe in this policy and although to a considerable extent, they are in direct competition with the interests represented by the writer, I nevertheless realize that the writer and myself, and the interests with which we are connected, are in the main workers in a common cause, namely—that of assisting to the best of our ability to raise the standard of illumination and to improve lighting conditions in general. There

can be no doubt that we are jointly interested in urging on the public the importance of good illumination and in furnishing to it correct information, since in that way the public will best be able to judge of the merits of our products and to make an intelligent choice.

There is not very much that I can add to this excellent presentation of the subject, but I desire to give, if possible, additional emphasis to the remarks on the subject of glare. Of all the faults which may be found in the lighting of industrial plants, the fault of glare is by far the most common, and the seriousness of this fault is not properly appreciated. In every case it deserves the most careful consideration. Brilliant light sources in the field of vision not only directly lower the working efficiency of the eye, but in addition, by causing eye strain and fatigue, they lower also the efficiency of the body and brain, not only temporarily, but often permanently. I can heartily endorse nearly every word that Mr. Hubbard has said on the subject.

The paper gives a brief summary of the conditions which should exist if illumination is to be considered satisfactory. These are: proper intensity of illumination, absence of glare, absence of flicker, and freedom from injurious invisible radiations. To these should be added the proper direction of the light. In textile mills this is usually of extreme importance and unless great care is exercised in the placing of the light units, awkward shadows from the machinery and operatives will exist and the result will not be satisfactory. It is for this reason that in weave and spinning rooms the best results cannot be obtained with comparatively few units of high candle power. For example, if in a weave room we attempt to use only one light source to a dozen looms, it is impossible to place the light sources so that the light will not be thrown on many of the looms in the wrong direction. At some of the looms the operative will cast the shadow of his body on the work, while other looms will receive the greater part of their light from the rear, with the result that the hand rail will cast a bad shadow, and will make it extremely difficult to see the threads at the points where they pass between the dents of the reed.

For a number of reasons it is desirable to have as few light units as possible, but we cannot in textile mills go very far in this direction and get the best results, although we may get results which are very satisfactory as compared with the crude methods of the recent past. In practically all cases, however, it is practicable to place the lamps high enough to be out of the reach of the operatives and thus make it possible to use the modern lamps of high efficiency.

Mr. Hubbard gives some figures for the cost of operation of various lamps, which figures, as far as I see, are correct with the exception of those for the Cooper-Hewitt lamp. Through some error the figures for this lamp have evidently been based on what is known as the mean lower hemispherical candle power, instead of the mean spherical, as stated, and they should therefore be doubled, in which case this lamp would have half the efficiency given in the table and would appear third on the list of comparative efficiency, following after the flaming and magnetic arcs.

These figures are, however, at best but rough approximations of the illuminating value of the lamps. They are all based on the initial values of the candle power, while with some the candle power depreciates quite rapidly with use and with others the average candle power throughout life is equal to the initial candle power. Again some of these lamps lend themselves very readily to the manipulation of the light rays by means of reflectors, while others do not, and their full efficiency therefore cannot in many cases be realized.

In closing I wish also to point out that the mere cost of current consumption does not at all represent the cost of operation, especially with current figured at the low rate of 1 cent per k. w. h. Some of the lamps referred to in the talk are very expensive to install and some are expensive to maintain and the annual cost of interest, depreciation and maintenance is therefore quite as important to consider as the cost of current.

Natural and Artificial Draft.

HENRY G. BRINCKERHOFF, 141 Milk St., Boston, Mass.

We see in Nature the fire burning on the open ground, making its own natural draft produced by the current set up by the ascending heated gas of lighter density rising therefrom. If the wind blows against the fire it is greatly kindled and the heat becomes intensified, but when the air is quiet again, the combustion becomes more sluggish. Hence primitive man no doubt imitated the wind with his lungs or by fanning. The discovery of confining the heat up a vertical tube to make a better combustion we can also suppose to be within the limits of this period, although the uses made of these applications were not based upon any scientific study or knowledge of the causes producing these effects in the way we are endeavoring to understand and apply such principles more intelligently in our discussion here this morning.

The term "natural draft" as in general use at the present time we understand to refer to the draft produced by the tube or chimney unaided by any other means and for a while we will confine ourselves to this restriction of our subject. The importance of a good draft is becoming more appreciated as the demands for greater steaming and the closest economy in generating are found to depend ultimately upon the ability of the chimney.

Nearly every treatise pertaining to chimneys and natural draft will be preambled with the following statement: "The natural draft obtainable from a chimney depends upon the column of gas inside the chimney being lighter than the air outside." This, however, is not altogether the sole cause in producing draft, as a wind blowing over the chimney produces considerable suction without the inside air or gas being heated at all; in fact, I have tested chimneys where I have obtained a slightly higher draft pressure than the temperatures and height figured to be possible. As there is always some wind in nature, this supplemental

aid to the scientific quantity of draft that we have produced by heat, is of importance and of considerable value, many localities thus favored obtaining a draft equivalent to perhaps 25 or 50 feet more of chimney height; nevertheless, as the wind is such an uncertain element we have to fall back in foresighting our calculations to what may be reliably obtained from an assumption of height and temperature conditions for producing a given draft by the stack.

There are only two dimensions to be determined, the height and the area, and we will consider first the matter of selecting the chimney

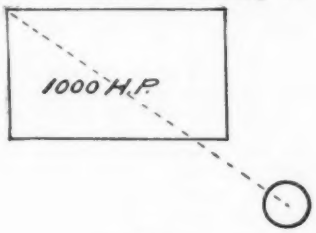


FIG. 1.

height. A proper height is of the greatest importance as this produces the dependable pulling force. This force must be sufficient to overcome friction through the grates, and this quantity of course varies according to design and percentage of air opening.

Through the coal, which depends upon its depth, quality, tendency to clinker and the intelligence of the firemen.

Through the boiler, which is more or less according to its general type and bafflings.

Through the flues and chimneys, which is affected by their size and shape as whether square or round; and whether of brick or iron, the former making for more resistance; and the crooks and turns.

Consideration for the adequate draft to cover these factors is no simple matter, but nevertheless should be squarely met.

The importance of a good height to produce a strong, vigorous draft involves some expense, but this expense can be offset by the use of fewer boilers with a less cost for a smaller building, as well as for the saving in foundation and piping.

It is becoming generally appreciated that there is also a considerable economy in running with fewer boilers, due more or less to the following causes:

First. There is less expense for banking same at night, as it costs no more to bank at night a highly developed boiler than for one running under or at normal rating.

Second. With an intensity of fire the gases are more completely burned to CO_2. A low flue temperature does not indicate that the gases were completely burned and in fact it generally shows that they were not, as well as having an excess of air.

Third. The better circulation set up and the more rapid circulation of steam makes for better boiler efficiency. I remember in my reading of an interesting account of a discussion on this matter. I think it was before the New York Railroad Club by some English engineers, going into the matter of heat transferrence from the fire to water in passing through iron plate or boiler tube, in which they maintained that experiments had absolutely proved that there was a better transferrence of heat to ebullating water than to still water, and abroad they have carried this out logically in firing special boilers to heat the water for the steam making boilers to enter as near its steam making point as possible.

Fourth. Although aside from any use of the Economizer there is generally a greater gain to be had from an intensive furnace, it is very apparent that the economizer value is increased greatly in bringing to a conclusion the all around efficiency to be had from intensive firing by bringing the heat in the flue down to the lowest point allowable to sustain draft, thereby making for practically as perfect utilization of the heat that is to be had.

Fifth. Less smoke produced. A good draft is necessary to the successful operation of any stoker, hence given the same co-operation to ordinary grates, less smoke will also result if combined with some intelligence that the fireman does not blanket the whole of his fire with green coal at a single operation.

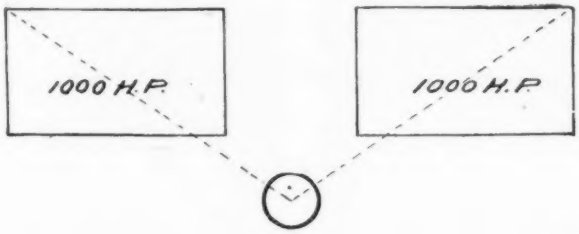


FIG. 2.

Unless some one should rise to prove the opposite, I would say that where experience has been found against tempting such heavy coaling and over rating (forcing, if you please) and where better economy was found to be had by running more, rather than fewer boilers, that such cases will usually be found where a poor draft exists, requiring more boilers to be used to get a larger grate area to spread the coal on thinner.

Speaking of forcing, the use of any chimney is to force the fire. So every fire not left to smoulder or burn on the open ground is a forced fire. If you considered your boiler merely as a

large kettle of some unknown size, whatever you could get out of it would be the capacity it was good for. Suppose you could get twice as much performance or more than before from any kettle, you would not consider you had caused any strain or injury nor would you; hence the word "forcing" in the sense of working beyond or close to its safe usage as would be in mind by use of the word applied similarly to an engine, does not exist. So long as the limit of safe pressure is never exceeded, the safe output of steam is unlimited.

It has come about in practice that the purchaser wishing to produce 1,000 boiler h. p. that the builders generally furnish him 10,000 square feet of heating surface or ten square feet per horse power, as it is a safe measurement to use with a very ordinary draft. But whether the purchaser obtains 1,000 h. p. or twice that, out of the size he has bought, is purely a matter of supplying heat enough and that is practically limited by only the draft strength to burn the requisite coal on the grates. As stated before, conditions may make it otherwise, as with a definite chimney draft installed the efficiency may be better below the builder's rating, at rating, or above rating,

So where a person is planning a new chimney, his course for determining the size should include consideration of the following:

For the Height. 1—the local advantages of the situation, as to exposure to wind and its general climatic dependence. As a general statement a high elevation at start for the foundation is an advantage, still it is not necessarily so, as sometimes a valley situation may be so placed that it may have an unusually strong current of wind drawn through same and seldom troubled with cross winds which would cut off the sweep above the chimney, but ordinarily the valley location demands a higher chimney to protect the plant against the loss of draft it would have, were it not hemmed in.

2. The placement distance of the furthest boiler or boilers, relative to the stack.

3. Type of boilers and grates.

4. Quality and depth of coal.

For the Area: 1—The size of his plant for determining the area. The boiler horse power or output does not need to be considered in determining the height as is mistakenly being done now with rare exception.

It is universally taught that "draft" is inversely as the square root of the height, but this use of the word "draft" applies only to the capacity which is more a matter of area as I will show later. The prime thing is a proper height, as it is this factor—adequately ascertained—that gives you the assurance of a provision for the essential force or pull to run your plant at a reduced expense for boilers, for their setting, piping and size of house, and with a better economy to boot. I wish you to note the distinction between draft pressure and draft capacity; the word "draft" is used too indiscriminately to either function and is unscientific as well as confusing.

Chimneys give a draft pressure in direct proportion to their height, thus 200 feet gives twice the pressure of 100 feet, and the pressure is the same for all chimneys having the same height, whether the area varies between them as 1 or 50 square feet in section, hence, therefore, if I have figured it to you on a reasonable assumption of 450 degrees in your flue gases and tell you it is 6/10 of an inch with a stack 100 feet high when the outside air is 60 degrees, then you will know that to obtain 9/10 of an inch that 150 feet height would be required regardless of any area, and for 1.2 inches the height must be 200 feet and so on. Afterwards selecting the area to suit the volume from the expected amount of output.

This factor 6/10 of an inch per 100 feet of height the writer believes is a safe basis, as in the winter time the outside air is colder, making for a still better result, and while in the summer it would be somewhat less by the outside air being hotter than the assumed 60 degrees, yet your heating system is off so that the work will be usually somewhat less, and in addition you have two likely forces that will most always make the draft better than this given factor, viz., the assistance of the wind and frequently hotter leaving gasses.

Many papers have been written on the subjects of chimneys and drafts, generally developing abstruse or speculative theories. The most helpful and practical that I have come across was in a recent article last year by T. F. J. Maguire, which gave definite measures of draft resistances, a summary of which is as follows:

DRAFT REQUIRED IN FURNACE.

Kind of Coal.	Lbs. of Dry Coal Burned per Square Foot of Grate per Hour.						
	.15	.20	.25	.30	.35	.40	.45
	Draft in Inches of Water.						
Eastern bituminous coals,	.12	.16	.20	.27	.34	.42	.52
Western bituminous coals,	.15	.20	.25	.33	.42	.52	.65
Semi-bituminous coals,	.15	.20	.28	.37	.48	.60	.80
Anthracite buckwheat, No. 1 and larger	.45	.70	.100				
Anthracite buckwheat, No. 2 and No. 3,	.75	1.30					

Loss of draft in boiler setting he measures as 3/10 of an inch to Water Tube boilers, increasing to 4/10 of an inch with 50 per cent. overload. Of course he intends this to be used with some judgment of application to the special boiler in mind, as to its construction and bafflings. The writer believes Horizontal Return Tubular boilers will be found to require the same allowance and the Manning and Vertical types of this or .15 of an inch. You do not have to take any multiple of the factor by the number of boilers.

Loss of Draft in Breechings: Maguire allows 1/10 of an inch per 100 feet of length to circular iron flues and .05 of an inch for each right angle turn. If square or rectangular shape, increase the above 25 per cent. For brick flues increase the above 30 per cent. The writer would allow for the stack travel the same as for the breeching.

The supplying of these reliable factors for fixing chimney dimensions to an intelligent basis to

meet the duty that will be required is of great service.

Let us see how the application of such factors would apply to a concrete case where we assumed we wished to burn 25 pounds of soft coal under Horizontal Return Tabular boilers with two right angle turns in the breeching.

Furnace draft for 25 pounds soft coal	.2
H. R. T. boiler	.3
50 feet of steel breeching	.05
Rectangular shape 25 per cent. additional	.0125
Two right angles	.1
Round brick chimney 150 feet	.15
Brick surface 30 per cent. additional	.045
Total draft required	.8575

Or approximately 9/10 of an inch, and as we can get 6/10 of an inch of pressure per 100 feet of height, then a 150 feet stack should provide the total pressure needed. Notice that this stack height is indifferent to any size or amount of horse power output, except as more boilers would require allowance for longer flue travel which would be very slight.

I would like the opinion of others on this showing, because if general practice is shown to coincide, it will be of much value and equally so if more reliable quantities can be established. I know at the outset that some will claim to have 150-foot chimneys and cannot burn at this rate, and if true, the cause may, however, be found due to excessive area absorbing the heat needed to produce the expected draft or to some other accountable reason.

It may be pointed out that no allowance for economizer draft effect has been listed. But as the straight open passage type of economizer has generally a greater free area than the flue, it can be reckoned on its length as for flue distance.

Further, you must know that the top layers on the coal bed make for a greater proportional resistance, so an economizer saving 10 per cent. of coal would ease the fuel resistance to produce the same output of steam, thus practically offsetting any effect of its own resistance, while the owner is 10 per cent. of coal in pocket with a proportionate draft pressure needed to accomplish the same output.

This has proved universally true through a period of over half a century so that the exceptions are now known to be due either to its faulty installation or fault in the design and size of the economizer selected.

Until further tests have been made to determine the actual pressures required for the usual run of commercial qualities of coal depths on grates, these figures may be treated with some caution, yet faulty as they may be, they will prove in the main quite trustworthy as a deviation will probably be found to be offset by some other, so if the boiler makes more friction, the coal perhaps will prove less. Hence, I believe determining your chimney height on a basis of such quantities better than making a dark guess as it is generally being done now, and no one will welcome corrections to the foregoing calculations more agreeably than myself, knowing a true schedule would be of the greatest value to every power producer. You observe the size of plant and number of boilers, except as they effect the flue distance, have no consideration in this matter of height determination.

That there is no definite height to correspond with a given size of horse power will be seen if a stack of sufficient height to suit a 1,000 h. p. plant is arranged thus:

That the same height should be equally sufficient with a proportional increased area for 2,000 h. p. arranged in this manner.

As the length of pull from furthest boiler is no greater than in the single 1,000 h. p. So too the same height would be satisfactory to 4,000 h. p. of boilers arranged in the following situation:

As the gases travel about 70 feet a second, a distance of 20 feet more or less is negligible in the flue resistance as is the fact of using an Economizer, presuming the open tube style is used with an area equivalent to the flue giving a straight-away passage. The prime requisites therefore for determining the proper draft pressure are the coal depth and the boiler type.

The selection of a suitable area to a chimney is as frequently a guesswork dimension as for selecting the height. Some have a pet rule of making it proportionate to the grate surface, regardless of the fact that if twice as much coal burned in one case as in the other, it would call for twice the flue area, because having double the amount of gas volume of the other. Others figure up all the tube area in their Horizontal Return Tubulars or Mannings or measure up the outlets of the water tube, etc.

As to build to a good height costs so much more in proportion than for area, it is a common fallacy to curtail on the former and increase the latter. Thus for 1,500 h. p. the owner provides himself with a stack of a height suitable for only 1,000 h. p. and uses an area good for two or three times this amount and wonders why, after putting up a stack "said to be good for 3,000 h. p." he has difficulty in getting 1,500 h. p. and has to have recourse to artificial aid. The theoretical area required for 1,000 h. p. of boilers with only 100 feet high is but 7 square feet under ordinary conditions and in order that this figure may be understood, I have appended the calculation at the close of this paper. In my own practice, I usually allow 20 square feet for a single 1,000 h. p. boiler installation as being ample for this amount of horse power at normal running and for the reasonable increased growth of plant and overload. For two or more thousand horse power I reduce this area allowance about 10 per cent., increasing the reduction on very large plants to perhaps 20 per cent., keeping 16 square feet as well within a safe limit per 1,000 h. p. where the plant becomes several thousand. For smaller plants, say, 500 h. p., for instance, I would allow 12 square feet, which is then more than three times the theoretical area on the moderate basis of a height of 100 feet.

(Continued on page 187.)

The piece goods manufactured in Japan in 1900 and 1908 were valued at $29,888,019 and $50,125,697 respectively.

Correspondence and Notes

UPON TEXTILE TOPICS AT HOME AND ABROAD

COST CALCULATING FOR BROAD SILKS.

BY JAMES CHITTICK.

There is hardly anything of greater importance to a manufacturer than to be able to determine with precision the cost of his goods, yet the difficulty of doing this with even fair accuracy is very great. People who simply buy and sell goods cannot appreciate this, but the manufacturer understands well how troublesome it is. Materials of various sorts have to be assembled and put through many processes, undergoing waste and shrinkage. All kinds of influences modify the different elements of the cost so that they are in a state of constant flux. Of all branches of manufacture the textiles are the most complex and of the textiles the silks are probably the most difficult to cost.

We will now consider the main elements in the mill cost of a fabric, and the manner in which they should be calculated and the various other points that need attention.

The principal items are the raw material and the preparatory work done to it; the specially allotted labor costs for the manufacturing operations; the piece dyeing, finishing or other subsequent processes, and the general expenses which cover all other items of cost, including interest, depreciation, expenses of all kinds and all labor not otherwise allotted.

It is to be assumed that whoever is doing the calculating is reasonably familiar with the subject, but it may be as well to state that raw silk sizes are expressed in deniers, thus, 12/14, 13/15, 14/16, etc. A 12/14 denier silk should average 13 deniers and must not be finer than 12 1/2 deniers or coarser than 13 1/2. Similarly, a 13/15 size, averaging 14 deniers, should not average finer than 13 1/2 or coarser than 14 1/2. This refers to the average sizing of the lot as, of course, individual parts of the skeins will run both much finer and much heavier.

As the seller has a limit of 1/2 denier, on each side of the average, within which limits his delivery must be accepted, this means that there may be a variation of a full denier between one lot and another, or say 7 per cent., which materially affects the cost.

The principal sizes of raw silk used in the United States are, in Japanese silks and in China steam filatures, 13/15 deniers; in Canton filatures, 14/16; in high class European silks, for weaving in the single, 14/16; and in other European silks, for organzine and tram, 13/15. The bulk of the silks used here falls within these limits.

To ascertain the yardage per pound of any given size of silk, expressed in deniers, divide 4,464,528 yards by the number of deniers. If the size is expressed in drams, divide 256,000 by the drams to get the yards per pound. To reduce drams to deniers multiply the drams by 17.44. To reduce deniers to drams divide the deniers by 17.44.

We have seen that the raw silk will vary in size from its supposed average. In practice it will be found that most lots will run a little on the coarse side, therefore, as a good working rule, it is well to calculate all raw silks as a quarter denier heavier than the average, so that a 13/15 size would be figured as 14 1/4 deniers, but bearing in mind that high class silks will be reeled pretty closely to count, while the lower grades will vary more, and that European silks are more reliable as to size than Asiatics.

We will now consider in turn the cost of the silk, and of the throwing, and the waste made in throwing; the dyeing; the take-up in weaving; the width to calculate the filling, and the waste in manufacturing.

The figure at which the raw silk should be taken is distinctly a debatable point and may be variously considered. Shall the basis be the average cost of the silk actually on hand; or the cost of such silk averaged with the estimated cost of such future purchases

as may be required to complete the season's production; or shall it be the current market price, or the current market price averaged with the prospective cost of other purchases to be made during the season?

Silk is a very speculative material and fluctuates widely at times, and various competing mills may be costing their goods at the same time on all sorts of different bases, some, who have a lot of cheap silk, basing their prices thereon and thus giving away the profit that such advantageous purchases should have afforded them, while others may be figuring on the highest current quotation, and so making their costs too high to get any business worth considering.

It is hard to advise on this point. Perhaps as good a way as any is to average the cost of the silk already purchased with the probable cost of what future purchases may have to be made, and then modify this according to circumstances.

The terms on which the silk has been bought must be brought into uniformity. Japan and China silks are sold on six months' time while Europeans run from ten days to four months, sixty days being perhaps the most usual terms. It is a long time before raw silk purchased is repaid for by the cash from the sale of goods, and it may be well to work on a six months' basis for all calculations. If this is done the price of the shorter time silks should be increased by the difference in interest.

Of course if no interest were included in the prices taken for the silk, and everything were figured from a cash cost basis, the general expense items would have to carry a larger amount of interest than otherwise. The thing should be as broad as it is long, but whatever basis is taken should be uniform for all silks.

Then must be considered the fact that Asiatic silks are not generally dealt in on a conditioned weight basis, as are the European silks, but generally run about 2 per cent. less than the invoiced weights. The basic price should, therefore, be correspondingly increased by this 2 per cent.

One of the secrets of successful manufacturing is to produce the finished product from as cheap a material as possible, using a silk just good enough, but no better, than is necessary for the work. A reduction in the quality of the material, however, may adversely affect the rate of production so that more may be lost in that way than is saved in the other. Nevertheless, silks of lower grade that might be too irregular in size for goods with a fine face, but which were strong and would wear well, might suit admirably for, say, a louisine check, when the pattern takes the eye and not the quality. Here is a place for the exercise of careful judgment and the calculation will be modified accordingly, as the silk, the weaving and the expense items may all be affected.

When silk is required in the form of organzine or tram it has to pass through the process of throwing, or twisting, work largely done by outside throwsters on commission, and the prices for which work are fairly uniform. If a mill does its own throwing, or other preparatory work, it should change on its cost sheet the current market prices for the processes.

In the throwing, two points require consideration. Waste has been made and the twisting has affected the length, and the consequent drainage, of the silk. What the wastage has actually been can be determined only by careful Conditioning House tests. What it should be is another matter, but the waste on poor silks will always exceed that on good silks. If silk is sent to a first class throwster it will probably be found that in the throwing of organzine, from good quality of stock, a waste has been made of 1 1/2 to 2 per cent. With good average tram stock the waste would probably run from 2 to 3 per cent. Less waste is sometimes made, but careless throwing may result in a far higher percentage.

In figuring the cost, therefore, it is well to put in 2 per cent. for throwing waste on good organzine stock and 3 per cent. for good tram stock. Cantons and Tussahs, which are far more difficult to throw, should have a 5 per cent. allowance made for throwing waste.

The take-up, or shortening in length of the silk when being thrown, varies with the size,

BROAD SILK
COST CALCULATION
FOR 100 YARDS OF FINISHED CLOTH

Sample

Date October 1st 1910

Sample ..... QUALITY #100 ..... Qual. Org. Ex. Tap. Fil. Raw Size 14 2/5 Deniers

Description Plain Taffeta, Colored Qual. Tram No. 1 Tap. Fil. " 14 2/5 "

Ave. length of warps 330 Yds. Reeding 65/3/1 Width in reed 36 1/8 Finished width 36 Inches.

110 Yds. Warp	6996	Ends	Organ. 2	Thd. 14/2	Twist 1.69	Drams or Count	14/18	Oz. %	Weighting 5.34	Raw lbs.	@ 5.27	$ 28.14
"		"	"	"	"	"		"	"	"	@	$
"		"	"	"	"	"		"	"	"	@	$
24-1/2 Selvages	72	"	"	"	"	"		"	"	"	@	$
Total	7068	"										
100 Yds. Filling	90	Picks	Tram 1/4	Thd. 3	Twist 3.35	Drams or Count	22/24	Oz. %	Weighting 4.55	Raw lbs.	@ 5.23	$ 23.80
"		"	"	"	"	"		"	"	"	@	$
"		"	"	"	"	"		"	"	"	@	$
Total		"	No. of Beams 1									

Particulars of Cost of Material

	Organzine.	Tram.	Cotton, Etc.	
Raw	$3.85	$3.60	$	$
Throwing	$ .16	$ .35	$	$
Thr. Waste	$ .08	$ .11	$	$
Dyeing	$ .43	$ .95	$	$
Winding	$ .15	$ .12	$	$
Doubling	$	$	$	$
Quilling	$	$ .10	$	$
Total	$ 5.27	$ 5.23	$	$

Conclusions.

	Per Yard Double	Single
Net Mill Cost	$	$ 70.20
Selling Cost $ 1.7020 —85	$	$ 82.89
Regular Selling Price	$	$ .90
Less Com. and Discount, 15%	$	$ .1350
Net Estimated Return	$	$ .7650
Less Net Mill Cost	$	$ .7020
Estimated Profit	$	$ .0630
Weekly Product per loom. Yds.		75
Loom Earns per week	$	$ 4.73

Warp'g & Bmg. 110 Yds.	7068	Ends @ 2 1/2 per C	$ 1.94
Twisting	7044 Ends @ 25 per M	$ 1.76 —3	$ .59
Weaving	1 Shuttles 6 Harness	99 yds. @ 7 1/2	$ 7.43
Gen'l Exp. $ 5.10 per week	75 yds. 100 "	@ 6.8	$ 6.80
Pattern Expense	100 "	@	$
Special Harness Expense	100 "	@	$
Cleaning	99 "	@	$
Picking	99 "	@ 1/2	$ .50
Clipping	99 "	@	$
Finishing	100 "	@ 1	$ 1.00
Piece Dyeing or Printing	100 "	@	$
Print Warp. W'vg before Printing	110 "	@	$
" " Filling for same	lbs.	@	$
" " Loom Exp for same	110 yds.	@	$
" " Printing	Colors 110 "	@	$
" " Rebeaming warp	110 "	@	$
" " Retwist'g	Ends @ per M	$ —3	$
Special Expense		@	$
" "		@	$

Finished wgt. 100 yards 11.57 lbs Net Cost, 100 Yards $ 70.20

Finished cost per pound $ 6.07

Fin. wgt. per yd. 1.85 oz. Fin. wgt. per sq. yd. 1.85 oz.

REMARKS:

Instructions: Include in Weights, for Waste, 4 per cent. for Warp, 7 per cent. for Filling and 5 per cent. for Cop Filling.—Add 4 per cent. allowance for tubes to cost of cop yarn. Figure dramage of thrown silks from raw size in deniers, and include for take up in twist 3 1/2 per cent. for Warp and 2 1/2 per cent. for Filling, Winding, Doubling, and Quilling should be figured on basis of raw silk weights.—Figure filling on width in reed. If piece dyes lose in length allow for it.—If different length warps than 300 yds. use different divisor than 3 for twisting. Figure throwing waste as 2 per cent. for good Organ, 3 per cent. for good Tram, 5 per cent. for good Canton, 5 per cent. for good Tussah

and with the twist put into it. In the ordinary two thread, 13/15 organzine, twisted with 16/12 turns, the take-up will be at least 3 1/2 per cent. Many people have an idea that the tram, slackly twisted as it is, does not shorten, but it does. Twisting coarse tram with three turns of twist per inch, will take up perhaps 2 1/2 per cent., and finer tram less. The above percentages of take-up may be used, and the drainage of the silk, calculated from the devices, should be increased to correspond.

Hand twist silk, such as is used for crepes, shortens greatly in twisting, and above thirty to forty turns, much more, running, say, from 10 to 20 per cent. For instance, the shortening of a four thread Canton tram, of 14/16 denier silk, in 70 turns, is about 16 per cent. The weighting to be put on the silk is a matter of judgment, but excessive weightings rarely pay in the long run. Dyers' prices rule pretty steady, but as there is generally a discount on them the net price should appear on the cost sheet. When making a calculation, it is a convenience, for many reasons, to figure in with the cost of the silk the throwing and throwing waste, the dyeing, and the winding, doubling and quilling.

(To be continued.)

THE IMPORTANCE OF URUGUAYAN WOOL.

Max Otto von Klock, Uruguayan vice-consul at Boston, sends us the following extracts from a report and letter of Consul General Jose Richling:

Sheep shearing commences in Uruguay at the end of September and lasts through the whole of October. From the end of October and during the following months the wool will be for sale in the markets of Montevideo and other places in Uruguay. The total exports of wool from Uruguay during the last few years were as follows:

Years.	Pounds.	Valued at
1906-07	92,593,000	$13,200,000
1907-08	105,820,000	15,400,000
1908-09	114,639,000	17,100,000
1909-10	132,700,000	21,100,000

In the year 1909 to 1910 the American manufacturers bought Uruguayan wool for only $3,500,000, and evidently did not buy in greater quantities because of their lack of knowledge of the Uruguayan market. The woolen manufacturers ought not to depend solely on their representatives in Uruguay, but should send their own representatives to Uruguay, as is done by the wool dealers and manufacturers of Belgium, France, Germany, Great Britain and other countries. The American representative could examine the wools and select those most suitable for his country. The expenses of the buyer would be easily offset by the higher quality and lower cost of the wools bought. Such direct purchase would prevent excess charges of freight, commissions, insurance and exchange, which the indirect purchase through European markets involves.

The advantages to be gained by the American mills when sending a competent buyer to Montevideo are of preeminent importance. While the mills may have directly or indirectly representatives in Montevideo (or Buenos Ayres), it is an incontrovertible fact that relations of many years' standing induce these houses to sell with preference to the European market; and to the United States only when the former is not possible, and then often on unfavorable terms.

Expenses of the voyage and a sojourn of three months would remain within $600 to $800, and the Consulate-General could find means for reducing even this amount, asking the steamship lines for reductions in the rates. The commissions now paid amount to a great deal more, and moreover, when purchasing through their own employes, the mills would secure much more favorable prices and especially the right standard of wool best suited for their particular goods.

The United States will need large quantities of wool in the future, and the far-seeing manufacturer who now sends a buyer to Uruguay will reap a large profit, as he will be conversant with the market there and the conditions of the country, which, within a few years is sure to astound many, because of the superior quality and large quantity of its wool.

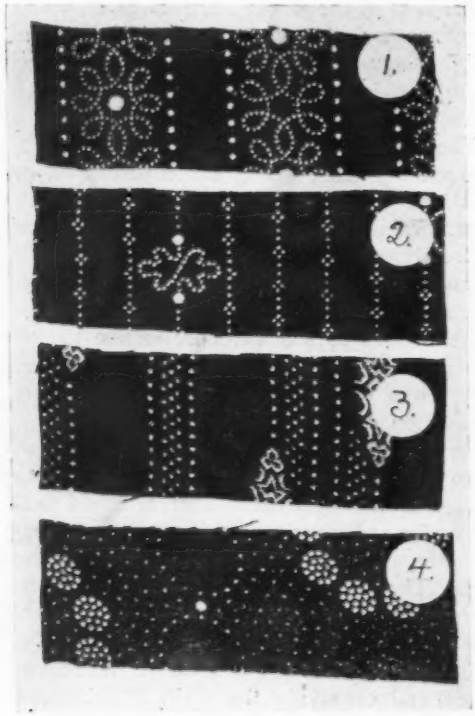
This representative could also investigate and report on the prospects of the wool trade

in Uruguay. The producers have bought, regardless of cost, the best sheep in the world for crossing purposes, which will result in a considerable increase in the quantity and quality of the wool produced in the future.

LATEST STYLES FOR DRESS GOODS.

BY J. W.

Figs. 1, 2, 3 and 4 are new styles for print cloths suitable for blouses and skirtings. Neat designs such as these are required.

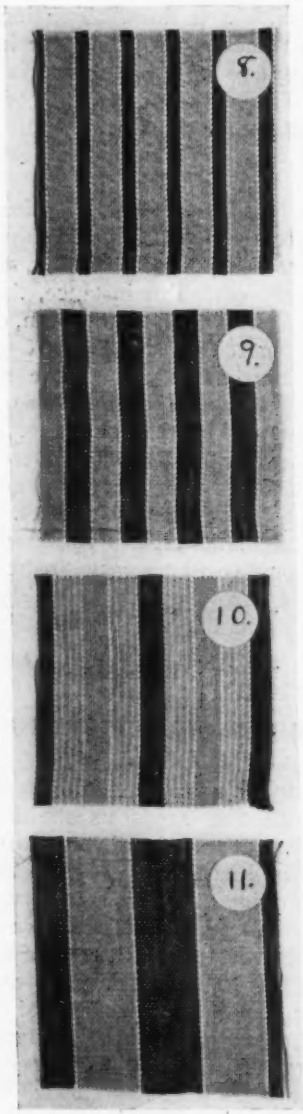


FIGS. 1, 2, 3 AND 4.

The small spotted stripes and grounds in various colors are very effective. Cloths of light texture are selling best at present in this class of goods.

Figs. 5, 6 and 7 are wool designs for tennis cloths. Various shades of grey and smoke colors in stripes are very fashionable. Costume cloths for ladies' wear are also made up from these colorings. The plain weave and four leaf twills are the weaves for these goods.

Figs. 8, 9, 10 and 11 are the newest styles for a zephyr cloth which is very light in texture. The colors for these stripes are black and French grey, with fine white stripes dividing the colors. The white stripes may



FIGS. 8, 9, 10 AND 11.

be silk or mercerized yarns drawn double in the heddles, the other portions being drawn

64 picks per inch of 2/80s filling. For these designs the filling is French grey.

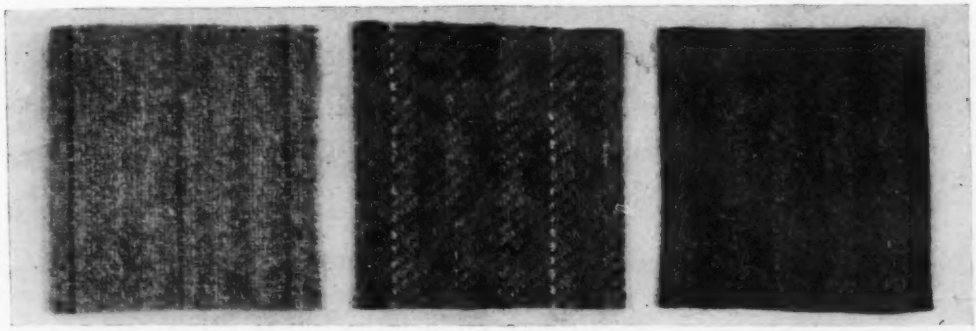
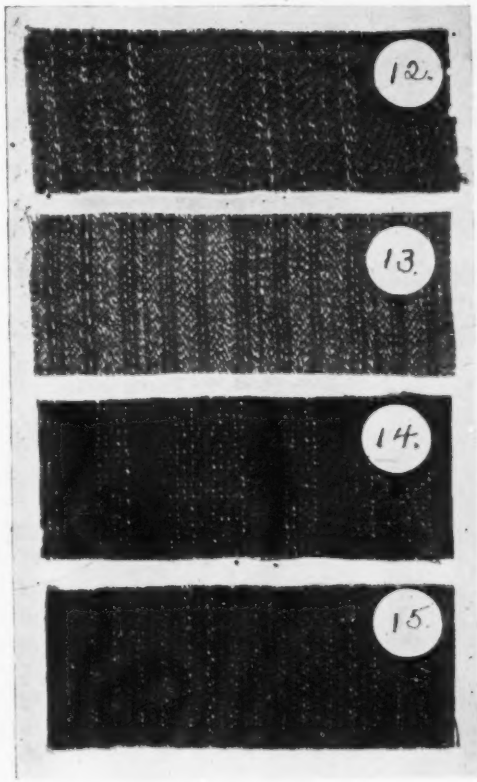
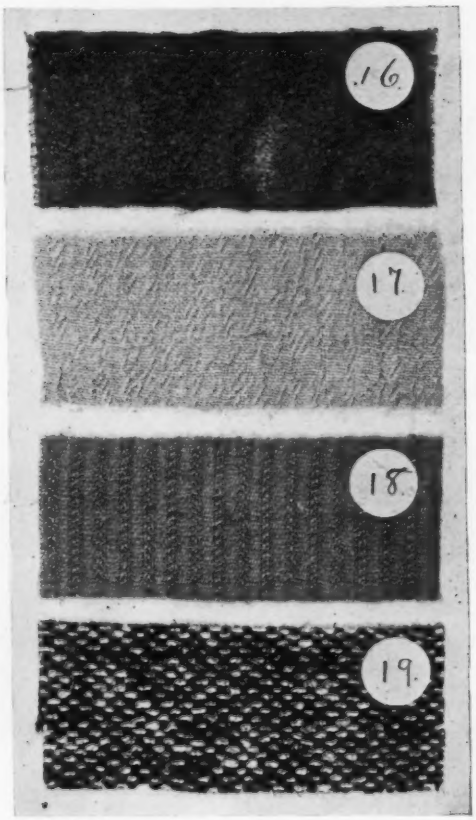


FIG. 5. FIG 6. FIG. 7.



FIGS. 12, 13, 14 AND 15.

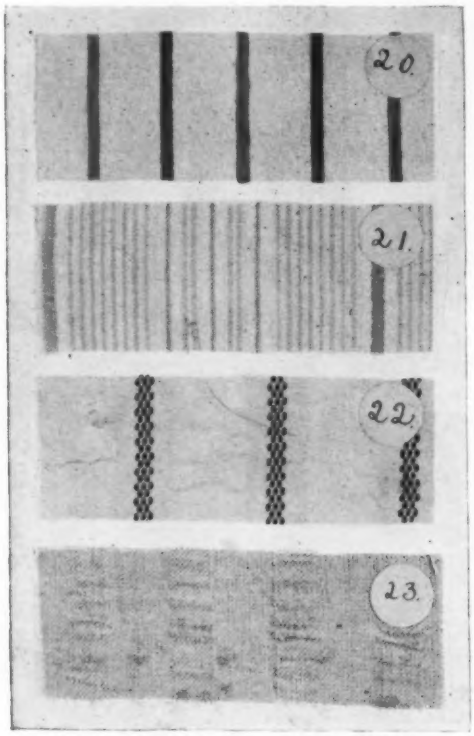


FIGS. 16, 17, 18 AND 19.

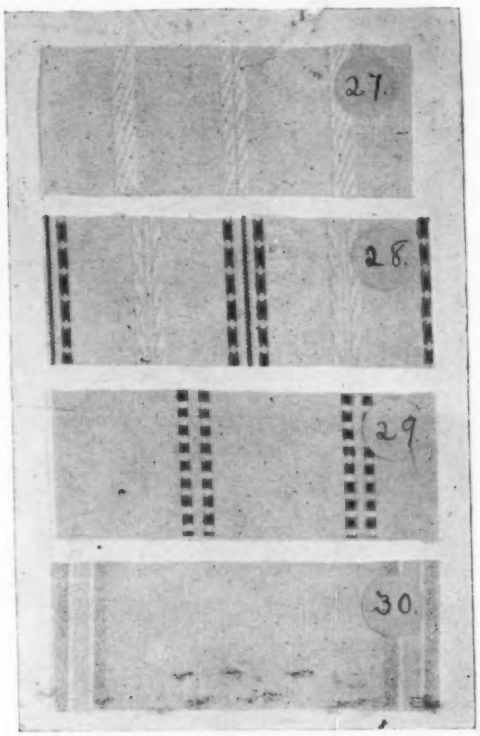
single. A good layout for this class of goods is as follows: 34 dents per inch, 2 threads in 1 dent, 2/80s warp Egyptian, and

Figs. 12, 13, 14 and 15 are new styles for woolen and mixed goods. The main features

of this class are the fine lines and mingled effects produced by using fine two-ply black and white twists or other colors to match the ground. In some cases printed yarns are used. Figs. 12 and 13 are twill weaves; Figs. 14 and 15 are plain weaves, cords being introduced by drawing several warp threads together in the heddles. Fine mohair filling is also used in some cloths.



FIGS. 20, 21, 22 AND 23.



FIGS. 27, 28, 29 AND 30.

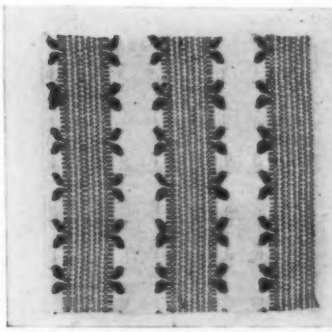


FIG. 24.

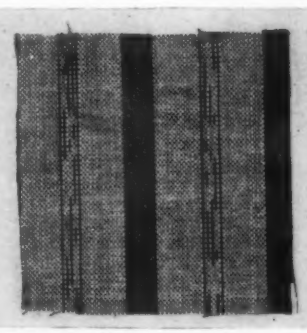


FIG. 25.

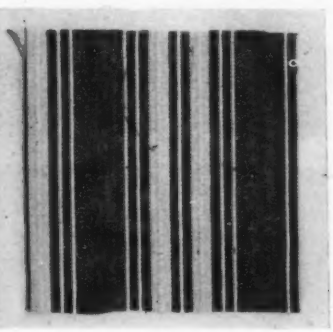


FIG. 26.

Fig. 16 is a new style for ladies' woolen dress goods. The peculiar feature of this class is the weave. "Granite," "oatmeal"

and other mixed weaves are desired, giving a full appearance to the cloth. Browns, fawns, French greys and black are the colors most used.

Fig. 17 is a crimp cloth which is produced by having hard spun warp and filling. The weave is plain. Fine yarns and reeds are required for this cloth. Worsteds are very fashionable at present.

Fig. 18 is a corded cloth produced after the manner of a "Bedford" cord. A few threads are woven twill or plain between each cord as desired. The colors for this cloth are cream, sky blue, drab, fawn, French grey and white.

Fig. 19 is a coarse Irish tweed cloth that is doing well at present in mingled effects of brown and grey. The weave is plain. These are mainly homespuns.

Figs. 20, 21, 22 and 23 are highly fashionable cloths in mercerized cotton and silk. The "crinkled" or "crimp" effect is produced by having a hard twisted yarn on a small beam which is allowed to weave slack while the ground or other portion is kept very tight. The difference in tension and twist gives the effects. Stripes of various colors in two shades of the same color, pink and blue, also light green shades are very effective.

Fig. 23 is a grey sample suitable for dyeing or bleaching as required. Solid effects are fashionable in black, navy, sage green, amethyst, ruby and French grey.

Fig. 24 is a new style of cotton blouse cloth. The figures are produced by a doup heald which is allowed to work the threads over several picks on the right and left side and then to float on the back. The ground is plain. All colors are being used, especially chocolate shades.

Fig. 25 is a zephyr stripe which is going well in dark colors. The fine broken lines are produced by printed yarns. In this case the stripes are black, the ground white, and the filling black.

Fig. 26 is a fine class of material known as "Silk Cambric" and is produced by having a fine two-fold warp, coarse cord warp yarns which are crammed in the reed, and fine silk filling. Black and white patterns are selling very well at present.

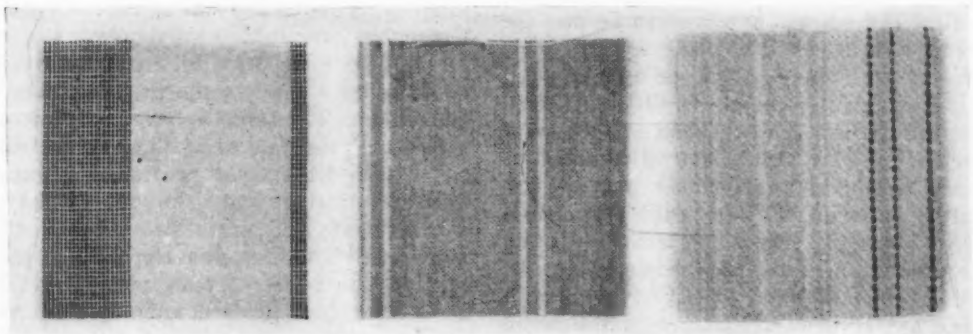


FIG. 31. FIG 32 FIG. 33.

Figs. 27, 28, 29 and 30 are the newest styles for a good class of shirting. Mercerized stripes are introduced on plain grounds of light colors or white. A good make which is selling well at present is as follows: 44 dents per inch, 40s Egyptian and 2/60 mercerized yarns, 64 picks of 20s American for the filling. The colors for ground are light pink, light green, light heliotrope and light blue, upon which fine stripes of black, navy, maroon, purple and dark green would be suitable.

Figs. 31, 32 and 33 are the newest styles for fine wool shirtings. These goods are coming out in very large patterns in all shades and colorings. Figs. 31 and 32 are

plain weaves. Fig. 33 is a four leaf twill. Fig. 31 is a black stripe on a white ground. Fig. 32 is a white stripe on an electric green ground. Fig. 33 is a light heliotrope and sage green stripe on a cream ground.

ENGLISH NOTES.

(By Our Special Correspondent.)

The first congress of the new Textile Institute seemed to be in general agreement that English workmen are more intelligent than Continentals and that English textile manufacturers and managers are less highly trained than their French and German rivals. The opinion appeared to be that the French are ahead in applying art to textile industry and the Germans in applying science—particularly chemistry. It was agreed that the English are proficient in the use of machines. The textile school element is rather strong in the Institute and a good deal of attention has been paid to the difficulty of bringing school and mill, theory and practice, into line. A Bradford manufacturer told how he declined to employ lads who would not go to evening school and how he deputed a graduate of the Technical College to go through the lesson books of his boys. Any of them who failed badly or shirked were brought before him and he made a school offense a mill offense. This manufacturer is firmly of the opinion that attendance at technical classes does no substantial good without discipline and responsibility. A cotton manufacturer told how his apprentices are liberated from the mill to attend classes on two or three afternoons a week. He bore testimony that thanks to technical teaching the weaving employers in East Lancashire have been getting better and more useful men during the last six years than any they could get previously. A little plebiscite taken by a silk manufacturer suggested that manufacturers were hoping to receive a great deal more benefit than they had obtained as yet from technical textile teaching.

The Institute has some project of sending lecturers round to supplement local textile teaching. It aspires to be the chief vehicle of communication between scientific men with ideas and practical men who have means of trying new ideas out. The body has the support of most of the titled persons who are at all prominent in the textile industry and at its first congress had an attendance of about a hundred men in all. There may be a desire for Kudos and honorific distinction in certain of the membership, but as yet there is an absence of trade axes to grind.

* * *

A flutter has been caused in ill-informed quarters by the new regulation as to the samples required by the U. S. Customs. Exporters have to deposit duplicates of the goods they expect to sell in America and to do so on or before the first shipment of the season. The samples have to be accompanied with the data of width, weight, count, etc., which have been previously required with every invoice and this despatch of type samples really lessens the work required of exporters. The Customs Department does not seem to have reckoned with the deviations from the standard type, due to misadventure, changes of finish and so on, which always occur in one degree or another in successive deliveries. Exporters dislike the trouble of submitting samples at all and the American Government is exceptional in requiring any. The Continental Customs cut their own samples from bulk and some of them take advantage of the most minute variation in threads or weight. It is not noticed, however, that any other custom house is more prolific in objectives and delays than the American one, and one merchant calls the American authorities the most arbitrary people that he has to deal with.

* * *

Circulars issued by the Federated Cotton Spinners and the Cotton Manufacturers' Association urge all cotton spinners, manufacturers, yarn agents, goods merchants and waste dealers to quote prices in pence and hundredths after October 1st. At the same time these parties are recommended to substitute pounds and multiples of 100 pounds for the tons hundredweights in present use.

A difficulty in the way of the latter reform arises from railroad practice. Rail rates in England are all based on the 2240-pound ton and the total number of rail rates on the companies' books runs into millions. As every lot of cotton is carried four or more times by rail in its progress into consumption it is clear that cotton people cannot avoid contact with the traditional ton.

With characteristic blindness the Decimal Association comments upon this circular that "it is curious that manufacturers can quote in metric where necessary." On the other hand it would be curious if they could not. Manchester's objection to compulsory metrics is put by a cotton manufacturer who mentions that all calculations of output and of counts would be appallingly complicated, that all the reeds would have to be remarked and all the standard wage-lists revised. The cotton trade simply could not be carried on without the familiar units and the woolen trade, unable to realize a world in which cloth is not viewed from the standpoint of ounces per yard, has never allowed the Decimal Association to disturb its equanimity and is not beginning to do so. There is no whisper even of the decimalization of pence and tons in the wool trade.

* * *

Wool dealers are urgently advised to ignore any offers of cheap wool made by strangers in Turkey. They will save money by doing so and save themselves the vexation that has come upon Bradford, Leeds, Halifax and Glasgow firms who have recently been plundered by Constantinople rogues. The tactics of the gang are the same as those of the rascals who used to operate from Smyrna. They offer samples of wool, but they deliver hair sweepings and dirt. They collect 80 per cent. or so of the invoice against documents and then disappear for a time, only to reappear under new aliases and to make their offerings in new districts. It is useless to rely on any references these dealers give. The only course is to withhold payment until the goods have been delivered and those who stipulate for those terms will have no trouble. The same swindlers, or their predecessors in business, have been known to offer horsehair.

* * *

High, square factories occupied by a score or two of tenants are characteristic features of Nottingham and are found in all parts of the city, occupied by lace curtain and hosiery firms, makers of garments and small manufacturers in non-textile trades. The factories were built thirty or more years ago and do not provide room enough for the largest modern machines. There has thus been a movement outwards towards the smaller towns and manufacturers have their machinery dotted in all directions. They want to get back to the city and the authorities want them back and want the taxes upon the buildings and the houses of the work people. Accordingly there is a proposal from the Mayor to erect municipal factories and let standings at low rents to machine owners. The proposal comes as near as we have yet got to the transatlantic practice of subsidizing new industries. It remains to be seen whether the Local Government Board will sanction the raising of public loans for this purpose. Room with power in Lancashire is sold to weaving employers by mill-owning companies and in Yorkshire principally by private persons owning the mill, boilers and engine.

* * *

The labor exchanges opened at the beginning of this year by the government for the purpose of facilitating engagement of help are being used to redress the labor shortage in the worsted and woolen mills. Familiar working in sweated trades in places like Liverpool are sought out by officials. The details of mill employment are explained, their fares are paid, houses are engaged and mothers and girls during their tutelage in the mills get $2.25 to $2.50 a week. In a month or two a family of three females which perhaps had to exist on a dollar a week is soon making ten dollars. The process is not precisely popular in union circles although the newcomers like the change.

A manufacturer who has been in trouble with his workpeople finds the official ex-

change of no use at all in case of a strike. The law allows union picketing and the exchanges are closely guarded by union men who dissuade others from taking up strike vacancies. Manufacturers on the whole think well of those institutions and are pleased to cooperate with them. There are no fees charged to either party.

* * *

A report that John Crossley & Sons, Ltd., of Halifax (Eng.), have bought the old A. T. Stewart plant at Groveville, N. Y., is contradicted by the firm. Crossley's, who employ some 3,000 people at their Halifax works, are still the largest of English carpet manufacturers and have doubtless been in communication with the owners of the Groveville property. Their president has spoken publicly of an intention to start works abroad and two or three years ago a delegate of the firm was prospecting for sites in Canada. The Canadian project was abandoned for the time being and it became known that the Crossleys regret that works had not been erected in America thirty years ago. The English factory is now full of work and it is reasonably certain that they are about to start in America.

* * *

A designer of jacquard styles was caught the other day going through second-hand books and soiled magazines for the purposes of trade. He was in search of reliable details to serve in executing a difficult commission involving scenes and emblems of stag hunting. When the bookstall failed he tried the picture postcard shops. More than one or two decorative patterns have been borrowed from nature via the post cards. Seedsmen's catalogues are an undoubted help and 60 cents is profitably invested by any floral designer in such a catalogue as Kelway's. Series of photo prints of flowers published in Paris, color prints from Italy and art monthlies like the London "Studio" are among the hidden reserves of some of our mills. It would be possible to mention by name carpet manufacturers who keep a particularly sharp watch for pictures likely to be suggestive to the designing room.

"New results on fabrics pay. We spend large sums experimenting in new dyes and finishes." Thus runs the advertisement of a Scotch dye works and the statement has the merit of truth. Within their own limits, finishes of real novelty are perhaps more lucrative than anything in the textile industry. Great store is set by the Bradford Dyers' Association on its branded finishes and Fulton's, whose advertisement has just been quoted, advertise at least half a dozen under invented names. The advertisement aims at the converters who, by means of a special and private finish, may be enabled to secure large bulks of trade. It is the case that some of our merchants and converters pay much more attention to novelty in finish than others do and are ready to make sacrifices to obtain a desired effect. They draw a commission dyer and finisher aside, explain their objects and send him some pieces to treat. They criticise the deliveries both as to merits and defects. Enterprising firms, like one prominent in the Bradford mohair goods trade with New York, will give a finisher carte blanche, telling him not to mind how many pieces he spoils so long as he is progressing gradually in maintaining the required characteristics and removing the defects. The finishers' reward comes in the shape of plentiful orders when success is reached, but the business is never his own as fully as if the cloth bore his own trade mark.

The bulk of the imported cotton into Argentina is American, with some from Peru and Brazil. Of the $101,365 worth imported in 1908, $8,292 was Brazilian, $13,806 Peruvian, and the remainder American, of which $65,582 came direct and $13,685 from stock in Europe.

The total quantity of sheep, lamb and alpaca wool imported from England in 1909 amounted to 809,000,000 pounds, exceeding the total of the previous year by 85,000,000 pounds. The importation in 1909 was the highest ever recorded, the previous being that of 1895, when 775,000,000 pounds were received.

Questions and Answers

Under this head we undertake to answer, free of charge, to the best of our ability, questions pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD RECORD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

If the question is not of general interest to textile readers and involves expensive investigation, a charge covering the cost may be made, of which the inquirer will be advised before any expense is incurred.

Oil Spots on Knit Goods.

Editor Textile World Record:

I am having trouble in removing spots of machine oil from socks that are to be bleached snow white. I can eventually remove oil by hard rubbing. I am enclosing a sample of the goods. How can the difficulty be remedied?

Bleacher (1227).

I am returning the samples of knit goods which I have treated in the following manner, with the following solution:

Aqua ammonia, 1 quart; best white soap, 1 pound; saltpeter, 2 ounces, and 2 gallons of soft water. Dissolve the soap and saltpeter in the water when boiling, let it stand until cold, then skim and add the ammonia. Soak the goods that are stained in the above solution for twelve hours, then proceed to bleach in the regular manner. If the oil is very strong it might be necessary to rub the goods lightly. The samples returned have not been rubbed. The above solution will not tender the finest fabric. Keeping the oil off the goods will pay better than the most economical method of removing the spots.

Alpha.

Temple for Narrow Selvage.

Editor Textile World Record:

Can you inform us what kind of a temple should be used on Terry cloth where the temple holds on a one-half inch edge? The Dutcher Temple does not seem to be practical for such work.

Buxton (1222).

We would suggest that if "Buxton" takes off all but two or three of the outside rings of the Dutcher-Hardaker temple, he will find that it will hold the fabric out all right, and will not tear or mark the cloth. Two rings will probably hold it, but three would be better if the inside ring does not mark. We have used Dutcher-Hardaker temples in that way on fabrics with narrow selvages, and find they work first rate. Weymouth.

Flyer for Spools.

Editor Textile World Record:

Can you advise me what would be the best flyer to use in taking cotton from a 7 inch spool, 5 inches in diameter? I have tried the flyer ordinarily used by silk manufacturers in taking silk from spools, but this does not give me the proper results with the cotton spools wound to the above diameter. Flyer (1225).

I presume the spool to which "Flyer" refers would be one of the usual type with a barrel of 1 1/4 or 1 1/2 inches in diameter, and that it is desired to draw off the yarn while the spool is in a vertical position.

I do not think that there is any practical way of accomplishing this by the use of a flyer. The trouble is that when the spool begins to empty, the angle that the thread would make in passing to the flyer and thence up would be quite sharp, increasing as the spool became smaller. When the thread was coming off the part of the spool just under the upper head it would be pulling at nearly a right angle. With such a pull as this the thread, unless very strong, might be expected to break constantly.

I placed the matter before a very experienced firm, specializing in the manufacture of flyers, and asked them to see what they could do in the way of a flyer of a special size, made of strong wire, and to be worked in connection with a cap. They replied as follows:

"We have experimented with a bobbin of the size you mention, and have made some flyers of proper sized arm and wire, etc., but we found they will not work, as the barrel of the bobbin is too small for the head size, the cotton breaking in consequence of the strain. Even the use of a cap will not remedy the trouble. We have experimented with this problem for others and we are unable to suggest anything that will answer."

James Chittick.

Broken Needles.

Editor Textile World Record:

We enclose sample of a 36-gauge standard B needle. We are having a lot of them broken off at the heads like sample. I am also sending a sample of a stocking. You will notice that it is broken between the gore. There is a place on the machine where the yarn guide never touches the needles, as they do not go in or out. Can you give me some information as to what breaks the needles? We are using a 79 standard B machine. Weston (1228).

There are a great many things which may cause the breaking of needles and for this reason it is a very difficult matter to give the exact cause of the trouble in "Weston's" case without having a chance to see the machine in operation. However, I will state the principal faults which usually are the cause of needle breakage, and by acting upon each of these suggestions separately "Weston" should be able to locate the trouble.

The principal cause of needles breaking off at the hook or cheek is running the machine at too high a rate of speed. A 79 standard B machine should not be run at more than 290 revolutions per minute.

Another cause for breakage is the stitch cams being worn off round at the corners. The main stitch cams should be kept well smoothed up, and when worn off at the corners should either be replaced with new ones or the corners drawn out and squared up. From the appearance of the sample sent me I would say that this was the cause of the trouble. When the stitch cams become worn it is impossible to get a uniform stitch or tension, which results in the fabric having an uneven stitch, one course being tight and the next one loose. This is especially true if the belts are not kept well tightened and a uniform speed maintained.

Using yarn that is too fine for the machine might also cause breakage of the needles. The use of such yarn necessitates the tightening of the stitch to such an extent as to put too much strain on the hooks of the needles. This always results if the machine is run at too high a rate of speed. The fault can be remedied by using a needle with a smaller hook or by reducing the speed, without affecting the weight of the goods.

Another cause for breakage may be not cleaning the head of the machine as often as it should be. Again the yarn guide or latch ring sometimes becomes worn rough and will break the needles. However, in this case the latch is usually broken off instead of the hook.

Too much care cannot be taken to keep the stitch cams and filling-in cams well smoothed up and the worn cams replaced with new ones so the needles will pass smoothly through the needle trough or path of the cam cylinder, thus preventing the needles from being subject to quick and unnecessary jars or strain. Merrill.

Determination of Weighting on Silk.

Editor Textile World Record:

Can you tell me of any test for determining how much a given silk has been adulterated by weighting, and particularly whether the burning test is accurate? Filature (1230).

This is one of the most difficult subjects of inquiry. By means of complicated and delicate chemical tests, fairly close approximations may be arrived at, but a different set of tests will be needed for each kind of weighting agent, and there are quite a few of them.

This is distinctly a technical chemist's work and, even if practical for an ordinary mill man to undertake, the chances would be that, owing to the omission of some detail or other, the results arrived at would be valueless.

The weighting actually given to a lot of silk will depend in a measure upon its boil-off. Japan silks average 18 per cent. loss in boiling-off; China, 19 per cent.; Cantons, 22 per cent., and yellow Europeans, about 23 per cent. A large percentage of the individual parcels will vary from 1 to 3 per cent. on each side of these averages, and occasional lots vary more widely.

If two lots of tram boiled down from 16 ozs. per pound, raw weight, to 12 ozs. in one case and 13 ozs. in another, and the dyes weighted each to 24 ozs. it is evident that one lot of the dyed silk would contain 50 per cent. of adulterant and the other would contain less than 46 per cent.

Much can be done in arriving at conclusions by opening up the dyed threads and seeing how many ends the thread is composed of, and then, by counting the filaments in each end, an approximation to the raw denierage may be arrived at. Then the size of the dyed thread can be compared with dyed and weighted samples of known composition and size, and the probable weighting determined in this way. After all, however, the best that can be said is that such and such a stock, thrown in such a way, and weighted to so many ounces, might produce approximately a similar thread.

The observation of the amount, character and color of the ash remaining after burning helps with its corroborative testimony. When the silk under observation has probably been dyed with similar materials and weighted with the same agent as what is customarily used in the local dyehouses, the character of the ash can be compared with the ash of silk of known weighting and of a similar origin, and intelligent guesses can then be based on the result.

If the silk being tested has come from abroad, where the dyeing practice may be different from what prevails here, or where the dyeing practices in different European countries or localities may differ among themselves, then the comparison of the ash may be inconclusive, or even misleading. The color of the ash is affected by the weighting agent used, iron, for instance, giving a different colored ash from tin.

Pure dye silk, of course, is readily distinguished from weighted silk by burning, but to determine the amount of the weighting used is a problem. James Chittick.

Waterproofing Fabrics.

Editor Textile World Record:

Can you give me formula for cravanetting cotton and silk union goods? Weymouth (1212).

Our English correspondent replies as follows:

As has already been stated in previous issues of the Textile World Record, rainproofing is successfully done only by a limited number of firms in this country. Naturally, their formulae are carefully guarded and valuable ones would not be sold except for a good round sum. There are two processes of recognized merit—the "Cravenette," which is worked in America by concessionaires and the "Millerain," which is not worked in the States. The best course for "Weymouth" to take is to ask the British Millerain Co., Ltd., Halifax, England, whether they are open to treat. They may be ready or may not. I am not aware that any other concerns have formulae for silk and cotton that would be worth purchasing.

Wessex.

In our May, 1910, issue we published a letter from Miller & Harrison, Wissahickon, Philadelphia, stating that they were waterproofing fabrics by what is known as the "Rellim" process, which they claim to be equal to any waterproofing process used in either the United States or Europe.

Dyeing Cotton Piece Goods.

Editor Textile World Record:

I would like to ask a question in regard to the dyeing of cotton piece goods. In matching a shade to sample, suppose about ten yards of cloth is taken and the sample matched in the padding machine. Is there any way of figuring out how much color would have to be added so we could follow along and do, say 1,000 yards, other than by actually testing in the machine. For example, into a box dyeing machine holding 100 gallons of water 30 oz. Dia Yellow FF, 18 oz. Dia Brown B and 30 oz. Dia Black BO was required to dye a drab on about five yards of cloth. With that data could the subsequent color required be figured out? Wentworth (1220).

The data given in the above question is sufficient to calculate very closely the quantity of color necessary to continue dyeing the cotton cloth for 1,000 yards or any other quantity to be dyed, provided it is remembered that the volume of the dye bath be maintained at a proper working level, and to supply fresh dye solution from the stock tanks made up in the exact proportion as the first trials indicate. Cotton, in almost any form, takes up, on an average, 12 1/2 gallons of water (or dye solution) per 100 pounds of dry material, consequently every 100 pounds of dry cotton cloth going through the machine requires that 12 1/2

U. S. gallons (which equals 100 pounds) of liquor must be poured in. Assuming that the cloth weighs 8 ounces per yard, there will be a total of 500 pounds of cloth requiring about 625 gallons of dye liquor in addition to that with which the dyeing or padding was commenced, and which should he made up carefully and added in several portions to the machine, only so fast as the cloth takes it up. As considerable quantities of color remain in the dye bath after the dyeing, it stands to reason that there should remain nearly the same volume of liquor as at the beginning. Dumfries.

Aeroplane Fabrics.

Editor Textile World Record:

I am impressed by the future that evidently lies before the aeroplane and want to know what type of fabric is being used for clothing the planes of flying machines. Aerostat (1224).

Our English correspondent replies:

The aeroplanes seen at English flying meetings appear to have wing-coverings of rubberized cotton, usually white or brownish, sometimes a slate or blue color. Most have two layers of fabric, one thickness above the ribs of the wings and one below. I have not heard of any textile manufacturers catering directly for aviators. The supply in this country rests mainly with rubber firms who buy their fabric and treat it with solutions and sell it to builders of machines. The case is similar, I believe, in Germany.

In order to deal more fully with the inquiry I have procured samples of aero fabrics from different sources and am sending them to the Boston office of the Textile World Record for the personal examination of parties interested. The samples are found on examination to be fine Egyptian cotton in most cases and linen in others. Most of them are rubber-coated, some being coated only on one side and some on both. The widths range from 36 to 44 inches, and the prices run from 19 cents (unproofed) up to nearly $3 a yard for three-ply rubberized fabric. The features on which the makers lay principal stress are lightness, strength and resistance to the absorption of moisture.

The fabrics supplied by the North British Rubber Co. weigh from 2 1/2 to 4 3/4 oz. per square yard in the rubberized state. They are stated to absorb in abnormal hydration from 5 1/2 to 12 per cent. of their weight. The breaking strains are said to run up to 3,000 pounds for the warp and 2,400 pounds for the filling, for a yard in width. The three-ply fabric of this strength weighs 4 1/2 ozs. and costs $2.80 a yard. Single cloth reputed to stand a strain of 2,160 pounds on the warp and 2,070 on the filling is sold at 75 cents by the same people.

The Dunlop Rubber Co. treat linen as well as cotton cloth and their makes run from 2 3/4 ozs. per square yard up to 5 ozs. Their prices range from $1 to $1.83 and the breaking strain of the best quality, linen, is given as 3,168 pounds for the warp and 3,409 pounds filling, for a width of one yard.

Rogers Brothers, proprietors of the "Aeroplatte" brand, have cloths between 2 1/4 and 4 3/4 ozs. per square yard and their top price is 45 cents. Strength tests on a Goodbrand machine, 9 inches between jaws, 6 inches wide, are quoted and the best result named is 387 pounds warp, 398 pounds filling. This firm supplies oil-proofed cloths, resembling yachtsmen's oilskins and recommend painting the fabric with a boiled oil preparation of theirs after the cloth has been stretched on the planes.

"Pegamoid" a celluloid-finished cotton cloth sold to aviators may from its composition be more inflammable than rubberized goods. The samples are fairly representative of the aeroplane fabrics in use in this country, where the aeroplane industry is rapidly extending as the result of exhibition flights. A biplane of the Farman type is understood to require about five hundred square feet of cloth to cover the planes once only; one thousand to give a double thickness. The largest aero yet built in England has planes with an area of a thousand square feet.

[The samples of aeroplane goods to which reference is made above can be seen at our Boston office.—Ed.]

Argentina is the largest importer of cotton goods in Latin America, and for 1909 its purchases amounted to $32,579,535.

Batting Felt.

Editor Textile World Record:

Enclosed is a sample of batting which you will notice has a strong kind of sizing on both sides which serves to hold the batting in shape. I would like particulars regarding the composition of the sizing used and method of applying it to the material; also to know the best way of cutting this batting into pieces 10 by 12 inches.

Artifex (1229).

The sample is too small to enable one to say whether an animal or a vegetable size has been used. The point could be determined by dissolving some of the sized surface and testing for starch. To judge from touch the agglutinant might be dextrin; or—as dextrin used alone tends to be brittle—perhaps mixed dextrin and gloy. Without having exact knowledge it may be suggested that the sizing of both faces is done simultaneously, say by passage through rollers which are automatically fed with the fluid. Apparently the size has to be almost instantly dried and this could be conveniently effected by a hot cylinder.

A band knife such as wholesale clothiers use for cutting out piles of garments from folded cloth would be one means of cutting the batting to any required dimensions. The apparent alternatives are dies made to measure, or slitters that would make continuous longitudinal cuts, leaving the cross cut to be made with a guillotine blade.

James Strand.

Bleaching Spun Silk.

Editor Textile World Record:

We enclose sample of spun silk fabric which we desire to bleach white. Please give formula for bleaching. Kingsman (1221).

The very best process to adopt for bleaching silk is with either peroxide of hydrogen or peroxide of sodium. It produces results upon clean material that cannot be secured by any other means, the white being permanent. To carry it out successfully requires that clean wooden tanks or vats be provided of sufficient size to accommodate a definite weight of silk goods, say 100 pounds, when immersed in the bleaching solution.

The water supply should be clean—not muddy—and the pipes free from rust or sediment.

Hydrogen peroxide comes on the market in carboys, and is usually designated "10 volume" strength, which means that every pint is capable of giving off 10 pints of bleaching oxygen.

The bleaching bath is prepared by diluting one part of the peroxide with three parts of water, then testing with blue litmus paper to ascertain if it is acid, i. e., turns the blue paper red. Add to the bath, a little at a time, common ammonia, and stir after each addition. Test with red litmus paper, making additions and tests until the solution changes the red paper blue. This is the bleach bath.

The clean silk is immersed in this bath cold, and kept below the surface by means of a lattice made of wood, for about 8 hours (over night is the general custom) when the bleach should be sufficient. Lift, allow to drain back (save all the old bleach liquor) and wash well with water, dry and finish.

In commencing this work, it would be the best plan for this correspondent to make a few trials on a small scale, mainly to determine whether the method above suggested is proper for his goods. Judging from the sample sent, we are inclined to believe that the strength is about right.

Beta Naphthol.

Decating Outfit.

Worcester, Mass., Sept. 20, 1910.

Editor Textile World Record:

On page 186 of the September issue of the Textile World Record, under the heading "Decating Outfit for Sale," appears an advertisement from a Philadelphia party which might mislead the reader into inferring that it might mean a vacuum outfit manufactured by the writer. The apparatus advertised is an imported outfit built by my brother, Ernst Gessner, Aue, Saxony, Germany, the only thing American about the advertised article being a pump which the writer furnished to replace the German pump that came with the outfit from abroad, and a winding machine adapted to take the German rolls, but not adapted to take rolls such as used or manufactured by me.

Respectfully yours,

David Gessner.

Knitting Department

THE KNIT GOODS SITUATION.

Very few buyers have been in the market during the past month and those that have been there are the smaller Southern buyers, so that business at first hands has been of small volume. Some few duplicates on heavy weight goods have been received from the West by mail, not large ones, but sufficient to indicate that the jobbers are having a fairly active season and that with the advent of cold weather there will be a demand for goods from manufacturers' hands.

Many buyers are finding themselves in difficulty at the present time on account of the suspension of business of one of the largest manufacturers in New York State. This concern has been making both light and heavy weight goods and has plenty of orders on their books, but by reason of financial difficulties have been obliged to shut down the plant, with the exception of a few machines which have been kept running to use up some material on hand. This manufacturer sold a great many ladies' ribbed goods on a basis of $1.90 for 6 pounds, and the fact that they are not being delivered has caused buyers to scour the market for this priced merchandise. As there are few manufacturers equipped to make this class of goods and the raw material conditions are not such as to encourage any one to go into the business, there is every indication of a shortage for this season.

The Oak Knitting Co. of Syracuse are equipped to make this class of merchandise, but are so far sold ahead now, that they cannot accept any orders except for delivery from the middle of November to the first of December. They still quote 6 pound goods at $2.00.

The Royal Gem Mills of St. Johnsville, N. Y., another mill making this class of merchandise, are asking $2.10 for 6 pound goods, so that the buyers who sold the trade on the basis of $1.90 have a serious proposition on hand to take care of their customers, even if the delivery dates are satisfactory.

There has been less demand for men's fleeced shirts and drawers this season than for several years past, but as the number of manufacturers making these goods has steadily decreased, those who remained in it are kept busy and as a consequence, prices have not been reduced. The ruling figures are $3.67 1/2 to $3.75 for high grade lines, with $3.37 1/2 to $3.50 for sub-standards, and we understand that there are some very light weight Southern made goods, running about 10 pounds to 10 pounds 8 ounces that have been sold as low as $3.25.

The line of fleeces sold by the MacKinnon Mills was sold on the basis of $3.37 1/2 and on account of the non-delivery, a great many jobbers have filled their orders with the low number made by the Harder Mills at $3.50.

The demand for men's ribbed goods continues to increase on all lines from 50 cent cotton goods up to the high grade silk and wool mixtures. The trade are becoming more exacting in regard to this line of merchandise even in the lower grades, and are no longer taking tuck stitches freely, but are using plain stitches instead, and are asking for two threaded lines. Among the retailers there is some call noticed for these goods made with cuffs, there having been complaint for some time on account of the sleeves without the cuffs becoming loose and baggy.

Some very attractive lines of ribbed goods are being shown made on the new Interlock knitting machines. This makes a fine appearing fabric and wears well, and the public apparently appreciate its advantages. There is one manufacturer who makes on the Interlock machine a cotton garment that gets to the retailer for 50 cent grade. This is the first season on this line and we understand that the trade are duplicating very freely, and that he cannot make deliveries on time.

Retailers are placing orders for spring lines in good volume. They seem to appreciate the fact that the lines being shown are priced somewhat lower than raw material conditions warrant, and it is quite certain now that manufacturers must ask for ad-

vances on all duplicates. The retail buyers who delay placing their orders early will find advances of 5 to 10 per cent. later on. Ladies' shaped goods are now held at advances of 10 to 12 1/2 cents per dozen above what early orders were placed at. There are only a few manufacturers who are in a position to take any more orders, except for late delivery.

Another line that is seriously affected by the suspension of the manufacturer as noted above, is men's 25 cent balbriggans of which this mill sold a great many on a basis of four pounds at $1.65, and with double seated drawer at $1.75. There are not many manufacturers equipped to make men's 25 cent balbriggans and most of them are in such a position that they are not open for additional orders. The buyers who have been through the State asking these manufacturers to take care of the orders given to MacKinnon, have not had much success.

A new feature that is being exploited in athletic underwear for men consists of four extra buttonholes so placed down the front of the shirt that they can be buttoned over the front drawer buttons and lock the shirt and drawer together. This serves to keep the shirt down and the drawer up in place and is meeting with ready sale. They are made in a line of nainsook, lawn and fancy mercerized cloths that get to the retail trade at 50 cents a garment and upward. Application for a patent has been made and the lines are now being shown on the road for spring delivery.

FANCY KNIT GOODS.

Business in ladies' and children's sweater coats continues very active. There is an increased demand for shaker knit coats for young ladies.

Some new and very handsome effects are being shown by the H. Lee Mallory Co. in ladies' coats made in fancy stitches and trimmed with velvet collar, cuffs and lapels in Persian colorings. The same line is also being shown with cretonne trimmings. This garment made with military collar makes a particularly attractive sweater, and tbe retailers who have been showing them at $12.00 and $15.00 each, have been obliged to duplicate their orders.

A new article to make its appearance in the fancy knit goods department is a knit

A KNIT AUTO CAP.

auto cap. We illustrate a very pretty design being shown by a Massachusetts manufacturer. These are made in a number of different patterns of mercerized yarn with mercerized trimming at $18.00 a dozen, and of mercerized yarn with wood silk trimming at $24.00. They are made in a wide range of colors and from all that we can learn are meeting with very ready sale.

CHEMNITZ REPORT.

The situation in the hosiery market has not changed materially during the last three or four weeks. The hopes of the makers that a larger demand would soon be felt have been vain, and the very fine light weight lisle hose have not brought the business that was anticipated. The only article that has sold are lace hose in boots, and outside of those, trade is still very dull.

Prices remained just about where they were, and owing to the increase in yarn prices, regular orders are hard to place, as most of the mills are very anxious for business. They often accept orders at less than

cost, and more frequently cheap stock offers are thrown in the market.

New York importers are offering orders for immediate delivery and payment on plain staple goods and split sole hose, but at such low prices that only those makers accept them who have to raise money at any cost, because they are bound to lose at the prices they get. These lots will probably affect the market in New York later on, to hold down prices of regular stock.

In gloves, makers are still busy on fall weights, and cannot get hands enough to sew up the goods. Very few orders have been placed for spring business, and trade will be dull in three to four weeks unless buyers begin operations.

ESTIMATING THE COST OF HOSIERY.

BY MERRILL.

A correspondent asks for information as to how to estimate the cost of 220 and 240 needle half hose and ladies' hosiery. It is difficult to compute the cost of any article without knowing the conditions under which they are manufactured. Costs vary widely in different localities owing to the different prices paid for labor. The finish has also much to do with the cost. I shall endeavor to give the cost of these goods, 220 and 240 needle hosiery, under normal conditions and also to present a system for computing cost which can be applied in any mill under any conditions. To conduct any line of manufacturing successfully it is necessary to know the exact cost of the product.

In the manufacture of hosiery it is necessary to know the exact cost of each style manufactured. Therefore it is necessary to have separate cost sheets for each style.

These cost sheets should be made out in a regular printed form, bearing every item of expense in the manufacture of the goods. Then all that is necessary to find out the cost is to find the amount of these different items of expense. The trouble with most cost systems is that all of the different items of costs are not included, with the result that a great many manufacturers do not know the cost of their goods. The different items of expense in the manufacture of hosiery and the form of the cost sheet are as follows:—

Yarn—Style 21.

Knitting Legs	$.....
Cutting Legs	.....
Topping	.....
Transferring	.....
Waste	.....
Turning	.....
Looping	.....
Hemming	.....
Inspecting	.....
Singeing	.....
Dyeing	.....
Forming	.....
Pressing	.....
Mating	.....
Trimming	.....
Stamping	.....
Ticketing	.....
Folding	.....
Tieing	.....
Box	.....
Boxing	.....
Selling	.....
Seconds	.....
Packing Case	.....
Supt. and Handling	.....
Water	.....
Office Salaries	.....
Depreciation	.....
Interest on Borrowed Money and Surplus Capital	.....
Taxes	.....
Repair	.....
Profit and Loss	.....
Discount	.....
Insurance	.....
Needles	.....
Forms and Boards	.....
Supplies, Office and Mill	.....
Freight and Express	.....
Advertising	.....
Fuel	.....
Oil	.....
Miscellaneous Items	.....
Total Cost	$.....

In most of these items of cost we have a set price of so much per dozen. There are several items which must be based on the year's production. An account of these items of expense must be kept for a year. These items are known as fixed expense and include the following:—

Supt. and Handling	$.....
Water	.....
Office Salaries	.....
Depreciation	.....
Interest	.....
Taxes	.....
Repair	.....
Profit and Loss	.....

Discount	.....
Insurance	.....
Needles	.....
Forms and Boards	.....
Office and Mill Supplies	.....
Freight and Express	.....
Advertising	.....
Fuel	.....
Oil	.....
Miscellaneous Items	.....

In most cases these items are all combined and listed on a sheet as fixed expense. A separate account of these items should be kept for general references. By the use of the above form the cost of men's 220 needle mercerized half hose would be estimated as follows:—

Style 21.

Yarn, 1 1/4 lbs. at 80 cents	$1.00
Knitting Legs	.005
Cutting Legs	.005
Topping	.09
Transferring	.05
Waste	.075
Turning Four Times	.01
Looping	.05
Inspecting and Mending	.04
Singeing	.01
Dyeing	.065
Forming	.01
Pressing	.0075
Mating	.04
Stamping	.005
Trimming	.01
Ticketing	.0025
Folding	.0025
Tieing	.0025
Boxing and Tieing Box	.005
Box	.04
Selling	.15
Seconds	.05
Packing Case	.01
Fixed or General Expense	.20
Total Cost per Dozen	$1.935

This cost is based on yarn at 80 cents per pound. It is possible to reduce the cost by using an inferior grade of yarn. The best quality of corded Egyptian mercerized yarn would cost 80 cents per pound at the present time.

The cost of ladies' 240 needle hose would be as follows:—

Yarn, 1 1/4 lbs. at 86 cents	$1.075
Knitting	.04
Cutting	.005
Waste	.05
Turning Four Times	.01
Looping	.06
Hemming	.02
Inspecting and Mending	.05
Singeing	.005
Dyeing	.06
Forming	.015
Pressing	.01
Mating	.04
Stamping	.005
Ticketing	.0025
Folding	.0025
Tieing	.0025
Boxing and Tieing	.005
Box	.04
Selling	.15
Seconds	.05
Packing Case	.01
Fixed or General Expense	.20
Total Cost	$1.907

I figured in the mill expense or fixed expense at 20 cents per dozen. This expense varies in different mills. The capacity of the mill and the grade of work has much to do with this item. I have known the mill expense to run as low as 14 cents per dozen, and have also known it to run as high as 25 cents. This is a most important item in figuring costs, and it is difficult to find what the exact mill expense really is. For all other items of expense there are fixed prices making it very easy to figure the cost until we come to the general mill expense. This item must include all general labor expense and all other expense not directly connected with the manufacture of the goods. Great care must be taken in including all these different items which go to make up the general mill expense. The only safe way to obtain the mill expense is to keep an account of these items for a year, also keep an exact account of the production of the mill for the same length of time. Then each dozen manufactured during this period must bear an equal share of this expense. In my estimate the three most important items in figuring cost are mill expense, waste and seconds. If we are able to get these items correct we will have no trouble in finding the cost of the goods.

The shipments of Australian wool from Melbourne to the United States in 1909 showed an increase in value of $1,696,234 over 1908, the totals being $5,809,997 and $4,113,763 respectively for the two years.

KNITTING NECKTIES.

BY LARAMIE.

Fig. 1 is what can be called a puff stitch or raised effect tie, which is made by arranging the needles so as to have three short latch needles and one long latch needle continuously around the cylinder. It can be made with either one feed or two feeds. With one feed the cast off cam drops down and holds on to the stitch which is on the long latch needle for three revolutions. Then the cast off cam rises and casts off this long latch needle stitch. The stitches on the short latch needles are casting off on every revolution. When this pattern is made on two feeds the cast off cams drop down for two revolutions and then cast off. This pattern is made generally in solid colors such as black, white, navy and garnet.

Fig. 2 is a plain stripe tie which can be made either with short latch or long latch needles as desired and is made on two feeds. On one feed there are placed, for example, a navy spool and a white spool and on the other feed only a navy spool. When the stripe is working one navy comes out while the white goes in for two revolutions. This shows up on the tie one revolution of white stitches and then one of navy stitches and again one revolution of white, then a space of four stitches, when the stripe is again continued as before and then repeated once

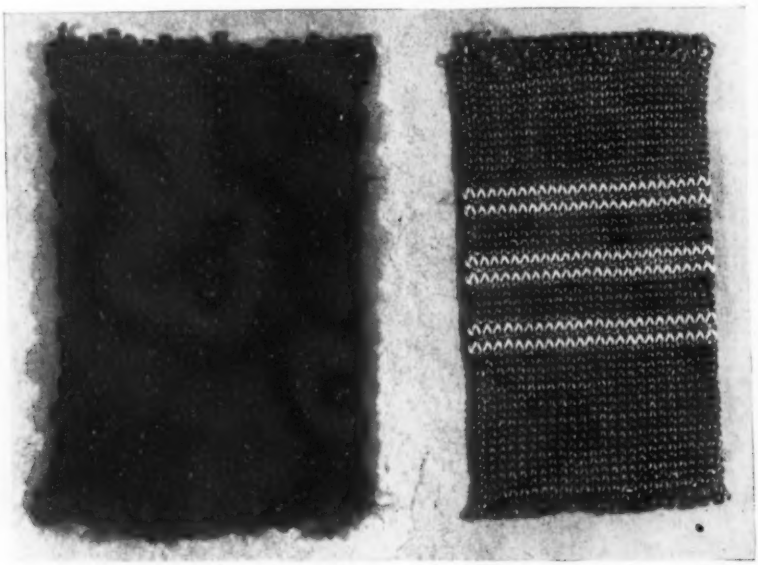


FIG. 1.

FIG. 2.

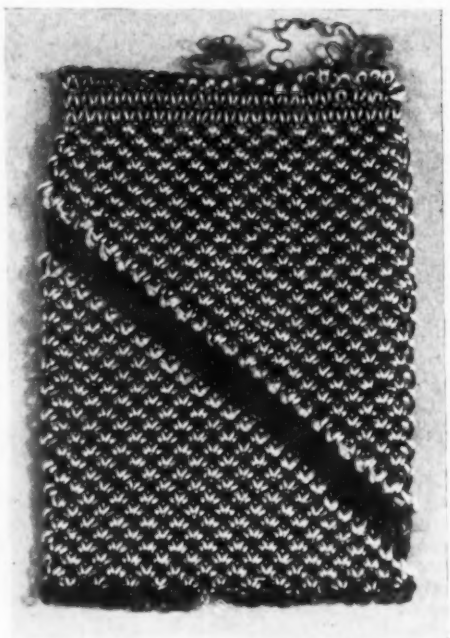


FIG. 3.

more. Then there is a space of an inch and a half plain navy before the three stripes start again.

Fig. 3 is known as a wide bias stripe tie. It is made on two feeds, using all long latch needles and a wheel cut one and one except at one place where a slot is cut which allows three needles to hold the stitches. This wheel has an even number of cuts in it and the cylinder has an odd number of needles, a plain wheel on one feed and the cut wheel as described on the other feed.

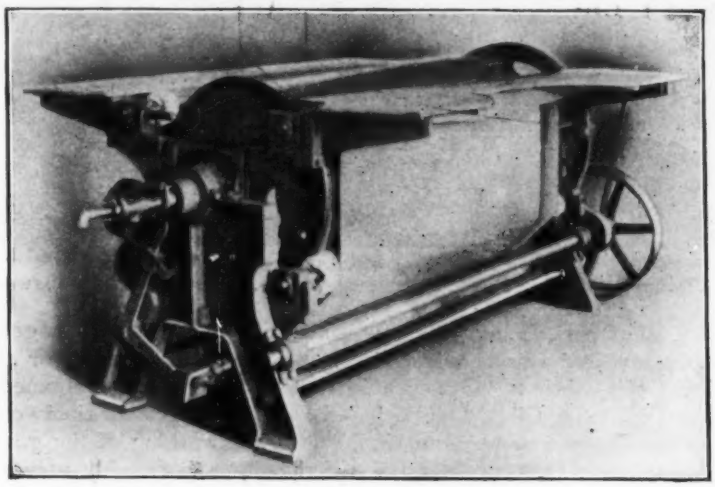
This pattern shows up very well in black and white, dark green and red, navy blue and Alice blue.

THE J. W. CRAW IMPROVED PRESS.

The new model shown herewith is manufactured by the J. W. Craw Machinery Co., South Norwalk, Conn. The improvements include the following features: By lifting the guide roll lever and turning the hand wheels, all the rolls are quickly removed from contact with the heated cylinder when not in use, increasing the life of the apron and padding of the rolls. By slightly turning the hand wheels, the pressure of every roll can be instantly increased or decreased, with a perfectly uniform pressure of each roll, to suit the finish of different garments. The uniformity of the pressure cannot be disturbed, which is a most important feature.

The additional finishing roll, the improved padding and increased size of the cylinder, produce a superior finish and increase the capacity of the machine. The combined automatic tension and guide roll is perfect in operation and placed at the under side of the machine, out of the way.

The steam inlet and outlet are combined in one connection at one end of the cylinder. This saves the expense of packing or of repacking and connecting of one end. This combined connection being specially constructed and packed, reduces the liability of leak to a minimum and makes it more convenient and less expensive to set and connect the machine.



THE J. W. CRAW IMPROVED PRESS.

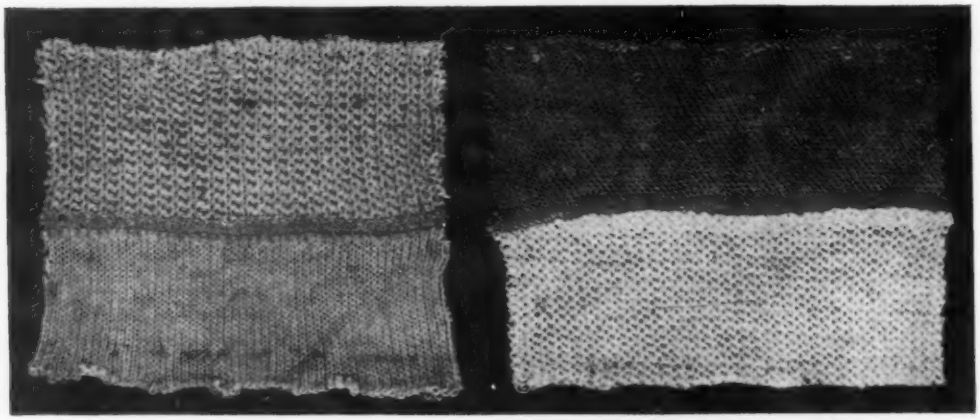
The builders of this machine claim that: "The machine reduces the cost of pressing to less than one-half cent per dozen garments. It has a record of six hundred dozen garments per day with two operators. It presses ribbed, flat, fleece lined, flat wool,

mesh or Swiss ribbed lisle underwear, union suits as well as single garments, for men, women or children without injury to buttons, giving a high grade finish. This machine is in operation and giving good satisfaction in many mills that produce very high grade garments."

TOPS ON HOSIERY.

Editor Textile World Record:

In your August issue "Marcellus" inquired about sewing rib tops on cheap grade socks. Besides the machines mentioned we would like to inform "Marcellus" that the Willcox & Gibbs hosiery trimming machine is especially serviceable for this work. Another process for doing this work is "Overlock" looping with the Willcox & Gibbs Overlock machine. I am sending you samples of the work. Otago.



OVERLOCK LOOPING.

W. & G. HOSIERY TRIMMER SEWING MACHINE.

Stains on Knit Goods.

Editor Textile World Record:

We are having a great deal of trouble with our bleached goods being stained and streaked. One part of a roll may be all right and another part in the same roll may be brown for several yards or may have yellow blotches all along in it. Some of our cloth run in the same batch will be different shades. We had several batches come out apparently all right, but after getting several weeks old they turned very yellow. Other goods bleached in the same way remained perfect. We are enclosing samples of these.

The following are our bleaching directions:

We boil in a covered wooden kier 8 hours. The kier has a vomit pipe in it. We use 1 lb. caustic soda to 100 lbs. goods. Boil 1000 to 1200 lbs at a time. Use 100 lbs. steam pressure. Rinse out in three waters in boiling kier. Run goods in bleach at 2° Tw. until specks are all out, say about 15 or 20 minutes. Run in cold water 15 minutes. Run in sulphuric acid for 15 minutes. Run in cold water, then in hot water and soap. Run in cold water about 10 minutes then to extractor. Beacon (1226).

The trouble "Beacon" is having with the yellow blotches and brown places in his knit goods is apparently due to haste in getting the goods through the process. It is a trouble that happens to most people in the bleaching business. The goods are either not boiled long enough, or are packed unevenly in the kier or jammed tight around the vomit pipe and slack on the outside. Again the washing of the goods in the kier if not done thoroughly prevents the chemic from doing its work as the bleaching agent is destroyed before acting on the cotton.

The weight of caustic is all right; another quarter of a pound to 100 pounds of goods would do no harm, or better still use half a pound of soda ash with one pound of caustic to every 100 pounds of goods; this will help to get them whiter. The length of time for boiling is all right, but the chemicing is too severe and too quick. It would pay "Beacon" to adopt the following method for chemicing the goods:

Mix 10 lbs. soda ash with every 100 lbs. of chemic powder in the mixer, or if he does not mix his own, add 5 lbs. of soda ash to each carboy of chemic at 14° Tw. Stir this up and then let it settle, using the clear liquor for the goods in the following manner: After boiling the goods, rinse thoroughly in the kier, lift out of kier into extractor, then into bleach at 1° Tw., letting them lie for one to three hours until the goods are snow white, without danger of tendering them, the soda ash producing the whiteness which the chemic lacks. "Beacon" might try one lot in this manner, checking the time of labor, cost of chemic and most important of all, note the difference in the color of his goods. "Beacon" must see that each roll is thoroughly saturated in the chemic bath. When they are white enough, wash out all the chlorine and sour at 1/2° higher than the chemic bath, letting them lie longer in the acid bath, say from one to two hours, thus giving the acid time to neutralize any traces of chemic that has been left in the goods. Wash the goods thoroughly after taking from the acid bath, then soap as usual and put in extractor. If this method is followed good results will surely be obtained.

Delco.

KNITTING MILL NEWS.

New Mills.

*Georgia, Rome. Buildings for the Cherokee Hosiery Mills have been completed, including a main structure of brick, 2 stories high, 63 by 107 ft., and an engine house and dye house, 30 by 80 ft. Eighty-five knitting machines and accompanying equipment have been set up and will be operated by electric power generated by a 125 h. p. steam engine and electric generator. The outlook for this concern is said to be very promising and they expect to install 100 additional knitting machines after January 1.

*Indiana, Hammond. A small knitting plant for manufacturing gloves, mittens and sweater coats was started some time ago by Edward Friend and Fred Friedlander and a recent notice of the corporation of the Hammond Knitting Co. referred to the incorporation of this business. They operate six or eight machines but are adding equipment as it is needed. The capital stock of the company is $10,000. Mr. Friend is president and Mr. Friedlander, treasurer.

New Hampshire, Laconia. W. S. Lowe and F. P. Stewart have formed a co-partnership and will start a small hosiery mill operating under the firm name of Stewart & Lowe. They will make a fine line of men's and women's hosiery, investing about $4,000. Mr. Lowe was proprietor of the old Lake City Hosiery Co. of Laconia and Mr. Stewart was proprietor of the Union Hosiery Co. of Tilton.

New York, Brooklyn. B. Shapiro has begun the manufacture of sweaters, bathing suits and other knitted goods at 103 Throop Ave.

North Carolina, Cooleemee. Machinery equipment has been received by the North Cooleemee Hosiery Co. and is being set up in the 40 by 100 ft. building just completed. This concern was incorporated in April with capital stock of $25,000 and succeeded J. M. Greenfield of Kernersville. Mr. Greenfield is secretary and treasurer of the company.

Ohio, Cincinnati. P. Goldsmith's Sons, John and Findlay Sts., contemplate installing knitting machinery for making baseball stockings. They are manufacturers of baseball supplies and sporting goods.

*Oklahoma, Osage. The American Hosiery Co. is now giving consideration to the necessary machinery equipment. This company has authorized capital stock of $100,000. Browne Cornelison, 406 Security Bldg., Oklahoma City, and G. L. Grace of Reading, Pa., are at the head of the company.

Pennsylvania, Pen Argyl. It is practically certain that a kitting mill will be established in Pen Argyl within a short time. A. J. Young is interested and is looking for particulars of necessary machinery equipment. A short time ago it was reported that Edgar L. Gold of Nazareth, Pa., would establish a hosiery mill here, but it is understood this refers to a separate project which has the backing of Pen Argyl business men.

Pennsylvania, Philadelphia. The second floor of the building at the N. W. corner of 5th and Chestnut Sts.has been leased by the Puritan Knitting Mills, with Samuel Titelman and Nathan Neuman as proprietors. This concern will manufacture high grade, full fashioned coat sweaters, shaker sweaters and ladies' knit goods of woolen and worsted yarn, using 3/15, 3/18 and 2/18 worsted, and 2/28 and 2/30 woolen. The plant, which now contains 10 knitters, 6 sewing machines and 3 loopers, will be doubled within a short time. Mr. Neuman, who was formerly connected with the Pennsylvania Knitting Mills of this city, will manage the plant. The production will be sold direct.

Pennsylvania, Reading. Albert W. Wolfinger has leased the two-story and basement building at the corner of Front and Washington Sts., which he is equipping with 140 knitters, 18 ribbers and 15 loopers, which he will operate on ladies' and men's fine hosiery, 240-needle goods, using 60s to 80s two-ply cotton yarns on cones. The product will be finished at the plant and sold direct.

*Pennsylvania, Reading. Work will be started about Oct. 1 on the new 2-story mill to be built at Oakbrook, a suburb of Reading, for the Oakbrook Hosiery Co. Manufacturing is to be

started as soon as the building can be erected and equipped for making women's 200-needle hosiery. Isaac Eberly is president and superintendent of the Oakbrook Hosiery Co., and Wm. G. Leininger of Mohnton, Pa., is treasurer. The new mill will give employment to about 20 hands and will have steam power plant and dye house.

*Pennsylvania, Strausstown. On Monday, Sept. 15, the new hosiery plant of Herbein & Anthony will be started up, manufacturing 144-needle men's half hose on 23 knitting machines. Harry W. Anthony will be in charge of manufacturing and the firm will do the buying. The plant is operated by steam power.

*Texas, Sweetwater. B. Baumgartner will be the sole owner of the proposed knitting mill and will combine the manufacture of knit goods with furniture, mattress, bed spring and wire fence making. He plans to make knitted goods of all kinds and will begin work on the building as soon as bids for materials and construction work are secured. Mr. Baumgartner is interested in information and prices of all kinds of machinery for a knitting plant.

Enlargements and Improvements.

*Canada, Ontario, Welland. The Chipman-Holton Knitting Co., of Hamilton, Ontario, is establishing a branch plant in Welland, which will give employment to 20 hands at the start. This step has been made necessary by the shortage of female help which they have been experiencing in their main plant in Hamilton.

Canada, Quebec, Coaticook. Penmans, Ltd., recently repaired the roof of the old cotton mill here and it is expected they will instal machinery in the building in the near future.

Canada, Ontario, Almonte. H. W. Lundy, formerly manager and buyer of the local plant of Penmans, Ltd., has assumed charge of the plant of the Almonte Knitting Co., Ltd. Mr. Lundy has also been elected a member of the board of directors and it is expected will shortly complete plans for extensive changes in the plant. As noted previously, this concern has recently been reorganized. Wm. Thoburn, M. P., is president, and A. G. Rosamond, vice-president.

*Georgia, Raccoon Mills. The Berryton Mills have organized with John M. Berry, president of the Rome Hosiery Mills, Rome, Ga., president; J. N. Cheney and C. C. Cleghorn, vice-presidents, and H. R. Berry, secretary and treasurer. As noted in earlier reports, the new company will take over the Raccoon Mfg. Co.'s property, make extensive changes, including the expenditure of $80,000 for improvements to property and new machinery, and change the name of the town to Berryton.

Indiana, Fort Wayne. Ten additional full fashioned knitting machines will be installed in the Old Fort Knitting Mills at an early date. This concern began manufacturing early this year, succeeding the Hinman Knitting Co. of Decatur, Ill., and is increasing rapidly.

*Massachusetts, South Hingham. The Hingham Knitting Co. has recently installed a power press, a 250-dozen dryer, increased the capacity of the dye house, and added 7 knitters, 2 ribbers and 1 looper.

*Minnesota, Minneapolis. The new mill building under construction for the Northwestern Knitting Co., on which work was started last spring, is now nearing completion. The new building adjoins their other buildings and is 150 by 150 ft., 5 stories and basement, with tower, 48 by 64 ft., 8 stories high. The construction, like all their previous construction in recent years, is reinforced concrete. The equipment, which will be for the manufacture of ribbed underwear, is all contracted for and will be of the latest type throughout. This concern manufactures the goods advertised as "Munsingwear." Clinton Morrison is president; F. M. Stowell, secretary, and Chas. S. Gold, treasurer.

*Mississippi, Meridian. Construction work has been started on buildings for the yarn department of the Pricilla Mills. The main building will be 150 by 50 ft., 2 stories high, and will be equipped with 5,000 spindles. In addition there will be a dry room, 50 by 50 ft. and boiler and engine room, 50 by 60 ft. The capital stock was recently increased to finance this enlargement.

*New York, Amsterdam. Work has been started on an addition to the yarn mill of John K. Stewart & Sons, which will be 60 by 100 ft. They manufacture knitted goods and yarns, selling the product direct at 918-919 New York Life Bldg., 346 Broadway, N. Y.

New York, New York City. A. A. Marks, 701 Broadway, manufacturers of artificial limbs, will replace some of their old knitting machines with new equipment. George E. and Wm. L. Marks compose the firm of A. A. Marks.

New York, Utica. An addition is being built to the spinning department of the Oneita Knitting Mills, Inc., 30 by 200 ft., which will be equipped for making combed yarns. Their present facilities are inadequate to supply the demand for combed goods.

New York, West Sand Lake. The McLaren Knitting Co. has shut down for two weeks to make necessary repairs to the plant.

*North Carolina, Drexel. Huffman & Mull, proprietors of the Drexel Knitting Mill, expect to dye and finish their product later, but have not decided when this department will be added. They manufacture men's and women's hosiery. This project has been mentioned previously.

*Ohio, Cleveland. The new mill of the Federal Knitting Mills Co. is at Detroit Ave., West 29th St. and Vermont Ave., and will be ready for machinery next month. When all the machinery is installed there will be 75 knitting machines, 48 ribbers and 55 sewing machines. Fancy knit goods, sweater coats, shawls, infants' wear and novelties will be manufactured. H. G. Goldberger is president; C. J. Hays, treasurer, and L. C. Seligman is vice-president. They buy 1/3 to 2/50s worsted yarns, 1/5 to 2/30s cotton, 2/10 to 2/28s woolen, and 2/10 to 2/40 mercerized. The product is sold direct to the jobbing trade exclusively.

Dyeing, Bleaching, Printing, Etc.

FINISHING MELTONS.

BY WESTON.

To make sure of a good melton finish, it is desirable that the selection of the stock and the construction of the cloth be suited to the desired end. However skilled the finisher may be, he cannot do justice to the cloth or to himself if these things are not properly attended to. It is required that a felt be produced that will entirely cover the weave, and when finished present an even, smooth surface, and one that will not rough up in wearing.

The stock must be fine and of a good felting quality, though not necessarily long. Short stock means a multiplicity of fibers, which is an advantage in felting and securing a level surface suitable to this kind of cloth. If shoddy is used, it should be similar in grade and felting quality to the wool. The chief point regarding the length of the staple of the stock, is that it spin well and produce a good, even and strong thread.

The lay-out in the loom should be such as will give the finisher ample opportunity to get the proper amount of felt. Since the cloth requires no gigging and only a smoothing off in shearing, it would seem that the finishing would be a very simple matter, but a suitable finish is due largely to a skillful handling of the goods in the fulling process, where it is possible to make or mar the fabric. The writer was once called to a mill where they were making a line of these goods, and they had been bothered to procure a felt that suitably covered the weave. We found they had been running the cloth double in the fulling mills, that is, two pieces on a side, with the mills closed to increase the warmth. The finisher had figured that additional heat and pressure advanced the fulling; and so it does, but the gain was in point of time, and not excellence.

It is well to make a distinction between felting and shrinking. An attempt to force the work may mean a gain in shrinkage, but a loss in suitable or substantial felting. By using hot soap instead of cold, one may force a shrinkage of two inches before any real felting is produced, which would mean a loss of that amount of fulling. Where the felting capacity of the stock is suitable, a proper ventilation of the mills, to keep down the temperature and so retard the work, results in better felting, as it gives an opportunity for a thorough knitting together of the fibers.

Cloth composed of a poor felting quality of stock often requires additional heat to force the fulling. If run cool, the fulling may stop and chafing begin. Goods requiring a heavy felt, made of suitable stock, should never be unduly forced in the fulling process.

In the case above referred to, we put the cloth into the mill single, closed the doors until a suitable warmth was secured, then opened the back door for ventilation, and good results followed. It took more time, but time was what it needed. This class of goods should always be fulled in length as well as width. Even though the weave would be suitably covered by fulling in width only, the quality of the felt would not be satisfactory.

By fulling both in width and length, a greater firmness of felt and a better finish are secured. The temperature and the length, a greater firmness of felt and a better finish are secured. The temperature and the fulling in length need to be carefully regulated so as to secure uniform results. By opening the back door of the mill an excess of heat may be avoided. If more ventilation is required, the front doors may be opened to suit, causing a current of air to pass through the mill. Where the cloth is properly constructed and the temperature attended to, there is no objection to running the cloth double, but it will require additional ventilation.

The fulling soap should be used cold, and

the moisture regulated by additional soap as the cloth gets dry, otherwise there will be a danger of chafing. Too much moisture should also be avoided as it tends to a spongy effect.

It is a good plan to tack the selvages, especially if they are inclined to roll. If the selvages are slack the tacking will hold them in place.

In the scouring there is no call for any special treatment, except that plenty of time should be taken, on account of the density of the felt. In rinsing off, a liberal supply of warm water should be used. While rinsing with the cold water, it is a good plan to close the outlet gates of the washer and allow sufficient water to accumulate to cover the cloth thoroughly. This opens out the folds of the cloth and gives the water a chance to work out the residue of the soap.

In the dry finishing it is a good plan to give the cloth a brushing before shearing.

If the shear brushes are in good order, this may not be necessary. The back or laying brush of the shear should not be allowed to fill up with flocks and become useless. The raising brush should be true and applied sufficiently hard to raise all the long and loose fibers that lay on the surface of the cloth. To illustrate the importance of making good use of these brushes, we will mention a case that came under the writer's observation. A certain mill that had gained a reputation for making excellent meltons, employed a finisher who had notions of his own regarding this part of the work, one of which was that the raising brush was too severe upon the face of the cloth. He adopted the plan of using the laying brush only, as that was more gentle in its action.

No very marked difference in the finish was noticed at the mill. After some months the selling agents sent to the mill some partly worn garments that had come to them with a complaint regarding the finish. The face of the cloth in these garments was badly roughed up, with loose fibers standing in every direction, and in some places rolled into little nubs. This condition was the result of the fibers that should have been raised in shearing, coming up during the wearing of the garments. By using one brush only, the fibers were being laid down all the time after the first run on the shear. By using both brushes, working in opposite directions, they would be worked up effectually. It fell to the lot of the writer to correct the difficulty; and in addition to the discarding of the raising brush, we found the laying brush so completely filled with flocks that it had little more effect than would a wooden roller of equal size. Had it been true that the raising brush injured the felted surface, the fault would have been in the poor quality of the felt rather than in the action of the brush. To get the best effect in pressing, the cloth should be slightly moistened by steam or otherwise, before entering the press. Then given a good firm pressing, running on to rolls to remain until cool. A light steaming to remove the gloss of pressing from the surface of the cloth is desirable; but it should not be sufficient to impair the effect of pressing in the body of the fabric.

MODERN DYEING CONDITIONS.

BY J. DOBROYD.

(From Dyer and Calico Printer.)

Continued from September.

About 3 per cent. bichromate of soda with 5 per cent. of sulphuric acid or 4 per cent. of oxalic acid may be used. If the yellow shade left by the bichromate interferes with the shade the material is to be dyed to, sulphuric acid of about 7 per cent. and 1 1/2 per cent. of tin salt may be used. Strong mineral acids weaken the shoddy considerably, as they tender the cotton, and, if the treatment becomes severe the cotton is practically carbonized.

The dyeing may be done by using acid dyes for the wool, and mordanting the cotton with tannin and nitrate of iron, the cotton being afterwards filled up with basic dyes in the cold. Or the wool may be dyed in an acid bath and the cotton by substantive dyes, applied in the cold without the intervention of tannin and iron. Very dark colors may, of course, be dyed straight away without any preliminary stripping, and sometimes only a partial stripping is needed

just to form a solid base to show up the color.

Potting is the most severe test to which a dye can be subjected, and nearly all colors are affected more or less by this process. Dark, full shades naturally bleed more than lighter ones, while brilliant colors always suffer by a loss of bloom and a general flattening appearance, and the lists and headings where they contain white cotton threads are always sullied. It is a general rule to give cloths a slight bloom up after potting, just about twenty minutes' boil with a little fast acid red, violet, or yellow, which takes away the flat shade and restores the richness of color seen when the fabric is looked across or overhand. Both potting and decatizing undoubtedly weaken the fabric, making it also thinner in handle and more papery, but they give a smooth slip to the cloth together with greatly increased luster.

Decatizing has come much to the front of late years, particularly when used in connection with a smooth cotton web wound with the cloth, and the process has, with great advantage, been applied to other than faced cloths. Coarse serges and friezes are made considerably softer in the handle by this process, and the added luster is in most cases as permanent as the life of the garment, permanent finishes being on a par with fast colors. In both cases the term is comparative.

Both in decatizing and simple steam blowing, the protecting wrapper, which is wound on to the perforated roll, should be of ample length and of fairly open make. If too short, the steam has a most energetic action upon the cloth overlaying the perforations, and these will probably show as dark spots on the fabric when blown, one for each perforation on the cylinder. Of course, this marking will only extend for a yard or two at the end nearest the roll, gradually fading away as more cloth is interposed between the blowholes and the fabric, the functions of the wrapper being to break the force of the steam and to equalize the pressure over the entire roll.

Both decatizing and potting to be effective must be applied to a tightly wound fabric. Probably the most severe method in potting is to wind the cloth on to the roll in a dry state giving all the tension possible. The action of hot water is then naturally to cause the fibers to swell in girth and contract in length, thus increasing the tension given in the winding.

For union cloths where the woolen part is dyed a logwood black to stand milling, there is nothing to beat the mordanting of the warp with tannin and iron, although much is heard about the superior fastness of coal tar blacks. Tannin, combined with iron and logwood, form a double tannate of logwood, and this has two great advantages over artificial colors inasmuch as the shade is much richer and the cotton feeds considerably. The general method of mordanting is a long steep in a cold tannin liquor followed by fixing with a bath of an iron salt. This method, however, wastes a considerable amount of coloring matter by the loose iron salts combining with the logwood and falling to the bottom of the bath. A better plan, although giving rather more trouble, is to give a lime bath after steeping in the tannin. This forms tannate of lime on the fiber which decomposes again when in contact with a salt of iron, forming iron tannate. After the iron bath, another lime bath is an economy; this time it neutralizes any free acids that may be present, and ensures the thorough fixation of a basic iron salt on the cotton in combination with the tannin.

Myrobalans are now the chief tannin matter used for black cottons, since their cost is now and their percentage of tannin much higher than that of sumach, while the extract is easily made and is very soluble. Its solubility is so marked that the addition of a still more soluble body to the bath is of much benefit. This acts by the solvent seizing hold of the latter, and thus facilitating the precipitation of the tannic acid on the cotton. Common salt is a suitable body to aid this precipitation, and may be added in the proportion of one part of salt to two parts of extract. Being very soluble, it also has the advantage of being neutral, colorless, and non-staining.

As the affinity of tannin for cotton is

greatest at low temperatures and least at high, it is advisable to enter the cotton in a warm solution and allow to steep for some hours until the bath is cold. By doing this the maximum amount of tannin is deposited as the temperature reaches the most favorable degree. Dyeing also should be done in the cold, the woolen having of course been dyed previously.

Considerable interest will be found in taking a view of the many changes which have taken place during even the short period of ten years. Colors and processes have been modified, some dyes discarded altogether and others if not rendered quite obsolete are very nearly so. Indigo extracts are no longer used to anything like the former extent, the chief remaining uses being the bluing of whites and to a small degree the dyeing of silk. Considering the price of extracts and also their fugitive nature, there is little cause for wondering at their disappearance, as all their uses can now be filled by the ever increasing number of anilines.

Cudbear and archil are now little more than names to the present dyers, yet but a few years ago they were in constant use for topping and imparting bloom to browns, clarets, and other fancy shades. Easy of application as they were, rich in shade and level in dyeing, they also had the fault of being fugitive, and so had to join the ranks of the forgotten.

(To be continued.)

DYEING OLD YARN.

BY E. HASTODEN,
Faerber Zeitung.

With spinners, stocks of odd parcels of yarn gradually accumulate, and it is the custom periodically to arrange these together in their respective counts and sell them, if need be, at some sacrifice, so as to get them off their hands. Colored goods manufacturers are often tempted to make purchases of this sort, and in these circumstances trouble almost always arises in the dyeing, since the bulk of the yarn may consist of many lots varying one from the other in such particulars as grade of cotton and amount of twist, although apparently all are of the same counts. It is this indiscriminate way of mixing the yarn which gives rise to the trouble in dyeing. A mixed batch will show irregularities as soon as it is entered into the dye bath, particularly when producing a light or medium shade with the direct dyestuffs.

The portions of the batch composed of one grade of cotton may absorb the coloring matter at a different rate to another grade; the threads more tightly twisted will absorb the color at a lower rate than those less tightly twisted. When the yarn has to be dyed black or a dark color the irregularities are not, of course, so pronounced. For the fault of unevenness the dyer is at once held responsible, and the matter is usually only settled by that person, when a commission dyer, agreeing to the responsibility.

From the dyer's standpoint the only course of action lies in refusing at once any responsibility in the dyeing of assorted stocks of yarn; and if such yarns sent to him are not so labelled, in taking the preliminary precaution of examining the batches of yarns before he puts them into process. It is a rather big undertaking to have to examine carefully all yarns received, but experience gives ability to detect a parcel of assorted yarns; in many instances the style of make-up is an indication. Irregularities in color make their appearance not only with the direct dyestuffs but also with the basic dyes, and more especially with Methylene Blue. The least trouble from this cause arises when the batch has been dyed in very slowly exhausting baths, such as Alizarin Red.

Another difficulty arises in the re-dying of already dyed yarns. Batches of this sort are made up of variously colored lots from stock, or all of one color. But in this case the commission dyer usually disavows responsibility beforehand, and thus the trouble falls not on him, but on the manufacturer. Black is generally the safest color to re-dye colored yarns, but the re-dying must always be done discriminately. A case is known of a quantity of yarn dyed with catechu having been re-dyed with Aniline Black. In due course this was associated with white in a cloth for raising; the mechanical effect of this operation caused the white portions to become soiled, with the result that hundreds of pieces were spoiled.

THE POWER PLANT AND THE DYE HOUSE.

The design of power plants for textile mills, owing to the large quantities of steam usually required for dye house purposes, embodies factors which make such plants distinctive types in the solution of the power problem. Owing to the large amount of steam required for both power and dyeing purposes and the fact that the supply of water for both condensing and manufacturing purposes was limited, the new central power plant of the Bigelow Carpet Co. at Clinton, Mass., designed by Chas. T. Main of Boston presents a very interesting solution of this problem.

A COAL POCKET AT THE BIGELOW CARPET CO.

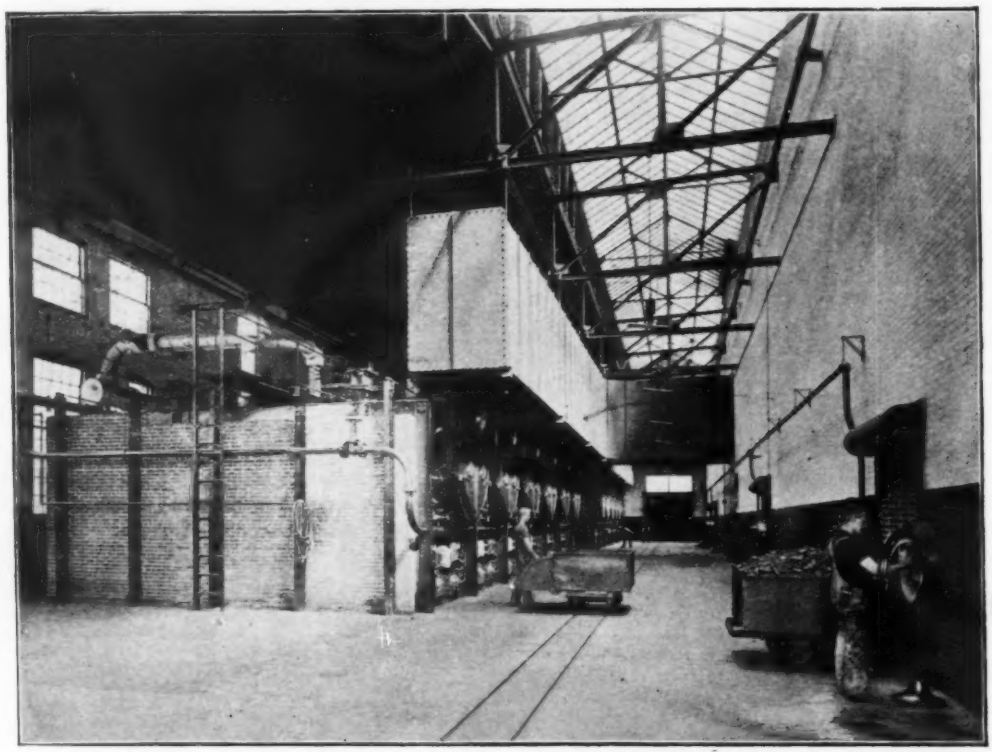
In this plant the boiler equipment consists of eight old boilers which were removed from the old Axminster power plant, and six new boilers. These are of the return tubular type, 84 inches in diameter with 180 3-inch tubes, 19 feet long, all of the boilers being built by the D. M. Dillon Boiler Works, Fitchburg, Mass. The engine room equipment consists of one cross compound condensing engine, direct connected to a 750 k. w. 600-volt alternating current generator, and a simple non-condensing engine direct connected to a 300 k. w. generator. These engines are the main power producers for the plant. In the engine room are also located two 50 k. w. generators driven by 12 by 12-inch simple non-condensing engines.

The condensing apparatus consists of a Wheeler Condenser & Engineering Company's surface condenser, an Edwards single air pump, and an 8-inch Wheeler centrifugal

pump connected to the overflow side of the condenser. In the pump room are three boiler feed pumps, a service pump for circulating cold water, and two Underwriters' fire pumps of 1,000 to 1,500 gallons' capacity, and a 3,000 h. p. Berryman feed water heater.

The main steam supply for all the engines, the pumps and the dye house is carried at 125 pounds gauge pressure. With the exception of the cross compound engine, all of the power generating units and all of the pumps except the fire pumps exhaust into a low pressure steam system in which the pressure is maintained at five to ten pounds gauge. This system exhausts to the atmosphere through back pressure valves. It supplies steam to the feed water heater and also to the heating system of the new weaving mill. The distinctive feature of this plant is the manner of connecting up the cross compound engine with the low pressure system and the handling of the condenser water to make it available for use in the dye house. The receiver between the high and low pressure cylinders is connected with the low pressure steam system, the steam exhausting from the high pressure cylinder at about 10 pounds gauge.

In case of an excess of steam in this system, the pressure will tend to rise, the low pressure cylinder will do more work and less work will be required of the high pressure cylinder, the supply of steam from the high pressure system being then automatically reduced. Should the pull on the low pressure system be sufficient to cause a tendency to reduce the pressure, the deficiency will be supplied from the receiver, the low pressure cylinder will do less work and the high pressure cylinder require more steam. In order to prevent any undue impairment of the efficiency of the engine, there is an auto-



THE BOILER ROOM AT THE BIGELOW CARPET CO.

matic reducing valve connection between the low and high pressure systems. The low pressure cylinder exhausts into the surface condenser in which the vacuum is kept at about 27 inches. The engine driving the 300 k. w. unit is also connected with the condenser and can be run condensing if desired.

The condensing water is supplied to the condenser from a pond or other outside source. The overflow from the condenser is discharged into a 12-inch main which leads to the dye house and to which is also connected the boiler feed pumps. One end of this hot water line leads through an elevated loop to the pond from which the water came. In the ordinary operation of the plant the dye house will utilize about two-thirds of the condenser water, the balance being used by the boiler feed pump to make up for the loss of steam in the system, or is discharged into the pond. On a recent test of this plant conducted by Mr. F. M. Gunby of Mr. Main's staff of engineers, it was found that the condenser increased the temperature of the water about 30° F. before it went to the dye house, a very great saving of heat units. It will be seen from the above that the arrangement of connecting the engine receiver to the low pressure exhaust system forms a practically automatic regulator for the steam required by the power plant.

Dye Recipes

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD RECORD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16-page pamphlet, in convenient form for preservation. Subscription price for the Dyers' Supplement $1.00 per year.

Recipe No. 145.

Blue on Cotton Yarn.

Triazol Blue B O O on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Triazol Blue B O O.
(Geisenheimer & Co., 189 Front St., N. Y.)
25 lbs. Common Salt.
1 lb. Soda Ash.

Enter at 180° F. and dye at a boil for one hour. Triazol Blue B O O gives a bright reddish shade of blue possessing the general characteristics of the direct cotton colors.

Recipe No. 146.

Red on Cotton Yarn.

Direct Fast Acid Red G on 100 lbs. cotton yarn. Prepare the dye bath with

4 lbs. Direct Fast Acid Red G.
(F. E. Atteaux & Co., 174 Purchase St., Boston.)
15 lbs. Glauber's Salt.
1 lb. Soda Ash.

Enter at 180° F. and dye at a boil for one hour.

Direct Fast Acid Red G possesses very good fastness to light and excellent fastness to acids. It will be found a valuable direct cotton color.

Recipe No. 147.

Black on Cotton Yarn.

Indo Carbon S on 100 lbs. cotton yarn. Prepare the dye bath with

14 lbs. Indo Carbon S.
(Cassella Color Co., 182 Front St., N. Y.)
28 lbs. Sodium Sulphide Crystals.
5 lbs. Soda Ash.
50 lbs. Common Salt.

Boil up the bath. Enter the material and dye at a temperature near boiling for one hour. Wring and immediately wash. The yarn is then after-treated in a bath made up with

3 lbs. Potassium Bichromate,
3 lbs. Acetic Acid.

In a standing bath the dyestuff may be cut down to 9 lbs. for 190 lbs. of material.

Indo Carbon S gives a desirable black possessing the characteristic fastness of the sulphur colors.

Recipe No. 148.

Yellow on Worsted Yarn.

Milling Yellow R on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Milling Yellow R.
(Read Holliday & Sons, 11 Gold St., N. Y.)
10 lbs. Glauber's Salt.
3 lbs. Acetic Acid.

Prepare the dye bath containing the requisite amount of cold or lukewarm water with the dyestuff, previously dissolved in lukewarm water. If the water is hard, naturally more acetic acid will be required. The material is entered and the bath raised to a boil and dyeing carried on for half an hour at a gentle boil; steam is then shut off and

1/2 to 2 per cent. sulphuric acid, largely diluted with water, is added and dyeing continued for a further half hour at a gentle boil. If the wool is on shade it is then washed off. If not on shade the bath should be cooled down, the requisite additions made, and the boiling continued another half hour. Two to 5 per cent. formic acid may be used in place of the acetic acid. When using formic acid the addition of sulphuric acid is not necessary.

Recipe No. 149.

Violet on Cotton Yarn.

Direct Fast Violet R on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Direct Fast Violet R.
(Kalle & Co., 530 Canal St., N. Y.)
25 lbs. Common Salt.

Enter at 180° F. and dye at a boil for one hour.

Direct Fast Violet R is a level dyeing color which exhausts well and is well suited for the dyeing of cotton yarn or of cotton piece goods in the jig dyer. Its fastness to light is very good.

Recipe No. 150.

Black on Silk Noils.

Silk Black B on 100 lbs. silk noils. Prepare the dye bath with

10 lbs. Silk Black B.
(Kalle & Co., 530 Canal St., N. Y.)
15 lbs. Acetic Acid.

Enter the material and dye at a boil for 45 minutes. Then add

2 lbs. Sulphuric Acid

and continue the boiling for 30 minutes. Then add

2 lbs. Potassium Bichromate

and boil for 45 minutes.

Silk Black B answers all ordinary fastness as to light and fulling.

Recipe No. 151.

Blue on Cotton Yarn.

Indanthrene Blue 3 G on 100 lbs. cotton yarn. Prepare the dye bath with

5 lbs. Indanthrene Blue 3 G.
(Badische Co., 128 Duane St., N. Y.)
35 lbs. Caustic Soda Solution, 77° Tw.
2½ lbs. Hydrosulphite Conc. B. A. S. F. Powder.

Add the caustic soda to the proper amount of water and heat to 140° F. Then add the hydrosulphite and finally the dyestuff which has been previously mixed with 5 to 10 times its weight of hot water, and gently stir until solution is complete.

The yarn, previously well boiled out and hydroextracted, is entered into the bath and dyed for 3/4 of an hour at 140° F. After the dyeing the material is boiled in soap solution for 1/2 hour.

Indanthrene Blue 3 G possesses very good fastness to washing and light.

Recipe No. 152.

Blue on Worsted Yarn.

Fast Chrome Blue O O on 100 lbs. worsted yarn. Prepare the dye bath with

9 lbs. Fast Chrome Blue O O.
(C. Bischoff & Co., 451 Washington St., N. Y.)
5 lbs. Acetic Acid.
15 lbs. Glauber's Salt.

Enter at 140° F. and dye at a boil for one hour. Then add

2 lbs. Potassium Bichromate

and continue the boiling for 1/2 hour longer.

Fast Chrome Blue O O possesses excellent fastness to light and fulling.

Recipe No. 153.

Violet on Worsted Yarn.

Fast Chrome Violet S on 100 lbs. worsted yarn. Prepare the dye bath with

4 lbs. Fast Chrome Violet S.
(C. Bischoff & Co., 451 Washington St., N. Y.)
5 lbs. Acetic Acid.
15 lbs. Glauber's Salt.

Enter at 140° F. and dye at a boil for one hour. Then add

2 lbs. Potassium Bichromate

and continue the boiling for 1/2 hour longer.

Fast Chrome Violet S possesses excellent fastness to light and fulling.

Recipe No. 154.

Orange on Worsted Yarn.

Milling Orange G on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Milling Orange G.
(Farbenfabriken of Elberfeld Co., 66 Lafayette St., N. Y.)
20 lbs. Glauber's Salt.
5 lbs. Sulphuric Acid.

Enter at 160° F. and dye at a boil for one hour.

Milling Orange G possesses very good fastness to milling, steaming, carbonizing and stoving. It

is well adapted for direct printing on wool and silk material.

Recipe No. 155.

Blue on Wool Raw Stock.

Hematine Past N O on 100 lbs. wool raw stock. Mordant with

3 lbs. Chrome,
3 lbs. Half Refined Tartar C,
1 lb. Blue Vitriol,

adding the goods just below the boil. Boil 1 1/4 hours, rinse well and make up fresh bath containing

25 lbs. Hematine Paste N O.
(American Dyewood Co., 84 Williams St., N. Y.)

Raise quickly to a boil and boil 1 1/4 hours. Rinse and dry.

Hematine Past N O is distinguished by its exceptionally level dyeing penetrating properties, and produces a rich, full black, superior to light, fastness and fulling.

Recipe No. 156.

Red on Cotton Yarn.

Direct Fast Acid Red B B B on 100 lbs. cotton yarn. Prepare the dye bath with

4 lbs. Direct Fast Acid Red B B B.
(F. E. Atteaux & Co., 174 Purchase St., Boston.)
15 lbs. Glauber's Salt.
1 lb. Soda Ash.

Enter at 180° F. and dye at a boil for one hour. Direct Fast Acid Red B B B possesses very good fastness to light and excellent fastness to acids. It will be found a valuable direct cotton color.

Recipe No. 157.

Pink on Worsted Yarn.

Chromazine B on 100 lbs. worsted yarn. Prepare the dye bath with

2 lbs. Chromazine B.
(E. M. Thayer & Co., 411 Atlantic Ave., Boston.)
10 lbs. Glauber's Salt.
2½ lbs. Acetic Acid.

Enter at 140° F. and dye at a boil for one hour. Chromazine B produces very bright shades of pink which are fairly fast to light and milling.

Recipe No. 158.

Brown on Wool Raw Stock.

Alizarine Seal Brown on 100 lbs. wool raw stock. Mordant with

3 lbs. Chrome,
3 lbs. Half Refined Tartar C,
1 lb. Blue Vitriol,

adding the goods just below the boil. Raise quickly to a boil, boil 1 1/4 hours, rinse well and make up fresh bath containing

7 lbs. Extract Fustic A W.
1½ lbs. Alizarine Seal Brown.
2 lbs. Alizarine Green A D O.

After one hour's boiling add 2 per cent. acetic acid.

Alizarine Seal Brown illustrates the advantages of using fustic as a basis for brown. The results are of exceptional penetration and of superior richness and extra fastness to light and fulling.

Recipe No. 159.

Yellow on Worsted Yarn.

Milling Yellow G on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Milling Yellow G.
(Read Holliday & Sons, 11 Gold St., N. Y.)
10 lbs. Glauber's Salt.
3 lbs. Acetic Acid.

Prepare the dye bath containing the requisite amount of cold or lukewarm water with the dyestuff, previously dissolved in lukewarm water. If the water is hard naturally more acetic acid will be required. The material is entered and the bath raised to a boil and dyeing carried on for half an hour at a gentle boil; steam is then shut off and 1/2 to 2 per cent. sulphuric acid, largely diluted with water, is added and dyeing continued for a further half hour at a gentle boil. If the wool is on shade it is then washed off. If not on shade the bath should be cooled down, the requisite additions made, and the boiling continued another half hour. Two to 5 per cent. formic acid may be used in place of the acetic acid. When using formic acid the addition of sulphuric acid is not necessary.

Recipe No. 160.

Blue on Cotton Yarn.

Direct Blue G O on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Direct Blue G O.
(Innis Speiden & Co., 46 Cliff St., N. Y.)
25 lbs. Common Salt.

Enter at 180° F. and dye at a boil for one hour. Direct Blue G O is reasonably fast to sunlight and exceptionally fast to fulling and steeping.

New Machinery and Processes

This department is designed to present from month to month a brief mention of new machinery, devices and processes being brought out in this country and abroad, that are of interest to the textile manufacturers. It is not a list of patents but of improvements on the market, the idea being to present to our readers a systematic monthly record of new machinery, etc., of interest to textile mill men.

Whenever possible we endeavor to make a personal investigation of the new machinery and processes described in this department. In the absence of such personal investigation we must necessarily rely upon information obtained from those who control the machines and processes.

We invite machine builders and others to send us such information for this department.

Anti-Friction Metal. The Glacier Metal Co., Richmond, Va., are putting on the market a metallic packing made of fine alloy of white metal shredded, being soft and pliable. It does not score the rods and shows no corrosion when it comes in contact with acids.

Spring Top Motion. Lupton & Place, Ltd., Burnley, Eng. An improved form of the spring top motion for looms which was first brought out by this firm three years ago. Cams have been substituted for the gears. It is stated that many looms equipped with this motion are running in Lancashire on sateens and other simple weaves and meeting with much favor.

Lace Dressing Frame. Manlove, Alliott & Co., Ltd., Nottingham, Eng. An improved frame for dressing lace. Both sides of the frame are adjustable so that the current of air for drying is directed to the center of the lace regardless of the width of the goods.

Silk Finishing Machine. Hermann Schroers, Krefeld, Germany. An improved compound traverse for finishing silk goods. The pressure on the knives is regulated by air pressure in a cushion. Before being rolled on the beam the cloth is passed over an expander which removes all creases and folds.

Air Moistener. James Howorth & Co., Ltd., Victoria Works, Farnworth, Eng., have developed an air moistener called the "Champion," which is now being offered to the English trade.

Scouring Wool. Gebrueder Schmid, Basel, Switzerland. A method of scouring wool which has been patented in Continental countries and is said to be giving good results.

Printing Process. Edward Siefert-Schwab, Neunkirchen, Germany. A method of printing the raised parts of fabrics woven with fancy weaves. The object is to produce changeable color effects.

Electric Stop Motion. Textile Appliances Co., Ltd., Glasgow, Scotland. An improved electric stop motion which is said to embody several novel features.

Ribbon Loom. A. Handschin, Basel, Switzerland. An improved ribbon loom which has been developed by two overseers in a Swiss mill.

Drawing Frame. Harold M. Briggs, Gotenburg, Sweden. A drawing frame in which a revolving tube is placed between the front and back rollers to impart twist to the strand.

Spinning Mule. Paul Davoine, Lyons, France. A spinning mule which carries two rows of spindles. It is stated that good results have been obtained in preliminary tests of the machine.

Spinning Ring. A. Salzmann, Zurich, Switzerland. A rotary self-oiling spinning ring which is claimed to embody a number of important improvements.

Crepon Effects. Pignol & Heiland, Potsdam, Germany. A loom for producing crepon effects.

Picking Motion. Marklissa, Germany. An improved picking motion for over-pick looms.

Loom Temple. G. Hunziker's Erben, Zurich, Switzerland. An improved temple for looms which has been introduced into a number of Swiss mills.

THE BURT COMBINATION SKYLIGHT AND VENTILATOR.

Ideal ventilation consists in supplying fresh air to the interior of the building without lowering the temperature too far for comfort. Many methods have been employed to accomplish this end and one of the most effective is that embodied in the Burt ventilator made by the Burt Manufacturing Co., 432 Main St., Akron, O. By means of

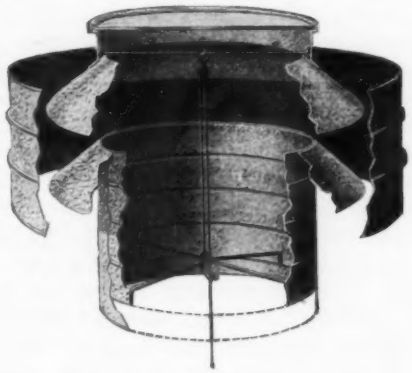


FIG. 1.

this ventilator impure air, hot air, smoke, steam or gas is automatically carried out of the building without expense other than the first cost of the ventilators.

The Burt ventilator is so constructed that when most needed, which is during perfectly calm weather, the ventilator will be effective in drawing the impure air from the interior of the building. Any movement of the outer air across the top of the ventilator causes an upward flow of air in the air tube, and the air that is next to the ceiling, the hottest air in the building, is drawn out. The ventilator prevents any back current of air and never becomes clogged with snow, ice or other substance, but always remains free and open. It is stationary and immovable, and, therefore, will not get out of order or require any attention, and it is noiseless. The Burt ventilator is simple in construction, ornamental and moderate in cost.

An important feature of the Burt ventilator is that it serves as a skylight as well as a ventilator, by reason of the glass top shown in the illustration, Fig. 1. The ventilator itself can be closed when desired without interfering with the passage of the light through the glass top. The ventilator is also made with a metal top, Fig. 2, to be used where additional illumination by means of the skylights is not required.

The damper of the Burt ventilator is so constructed that the airshaft remains always free and unobstructed, whether the ventilator is closed or not. In other ventilators, when the flat damper commonly used is partly closed, the air current strikes the damper and is deflected back into the room; while in the Burt ventilator, the airshaft being always wide open, the air current flows unobstructed to the top of the air shaft, where it escapes from the ventilator. Thus the "pulling power" of the Burt ventilator is far greater than that of any other stationary ventilator. As it is unaffected by air current, the Burt ventilator damper never moves from any position in which it may be set, whereas the flat damper is in constant movement and therefore requires frequent attention.

The Burt ventilator leaves the airshaft open and unobstructed, consequently the "pulling power" is greater than where the flat damper is used, and for this reason a

FIG. 2.

smaller number of Burt ventilators is necessary to ventilate any building. The Burt ventilators are in use in the leading textile mills throughout the country and are frequently required by mill architects in drawing up specifications for new mill construction.

THE ECONOMIZER AS AN INVESTMENT IN TEXTILE MILLS.

BY GEO. H. GIBSON.

The engineering features of economizers are generally well understood. Practically all engineers are agreed that they give substantial savings in all power plants. While the scientific feature of economizers may be of interest to engineers only, there is a side that should be investigated by every textile mill owner who has to spend money for power, that is, the saving of fuel effected by economizers, and the financial returns they pay on the investment. As more than 250 textile mills alone in the United States are using Green fuel economizers, it is evident that the economizer must be a paying proposition.

While such matters as the reduction in cost of cleaning boilers, elimination of strains, etc., are interesting, the economy can, however, be reduced to dollars and cents, showing that an economizer is a safe investment and pays a good return on the investment. The fuel saving varies considerably with conditions, but tests made on a few Green fuel economizers in textile mills have given these results:

	Per cent. saving in fuel bill.
Spartan Mills, No. 1	9½
Spartan Mills, No. 2	12½
Natick Mills	12½
Erwin Cotton Mills, (Duke)	11½
Loray Mills, (Gastonia)	12
Arkwright Mills	13
Newburgh Bleachery	11
Chelsea Jute Mills	11

The average saving in the above eight mills is 11.6 per cent. With these data we will figure through a practical example, but in order to be on the safe side, will assume that the saving in fuel amounts to only 10 per cent.

Operating 10 hours a day, 300 days in the year, with coal at $2.50 per ton, the saving in coal due to the economizer is $1,660 per thousand boiler horse power. Assuming the economizer costs $5 per h. p. installed, or $5,000 per 1,000 h. p., the annual cost saving per year amounts to 33 per cent. of the first cost.

The interest on investment may be set down at 5 per cent.; the cost of maintenance is in many cases negligible, but for purposes of illustration is assumed to be 1 per cent. As evidence that this figure is not too low, it should be noted that the Green Fuel Economizer Co. guarantees repairs and maintenance for 1 per cent. of the first cost per annum. As for depreciation, many Green economizers in this country have been in use for over 30 years, but let us assume 15 years as the life of an economizer. Depreciation can then be assumed at 5 per cent., for 5 per cent. of the first cost set aside yearly and compounded at 5 per cent. interest will produce a sinking fund by which the economizer can be replaced at the end of 14.2 years. Adding these items together, we have 11 per cent. which should be deducted from the 33 per cent. saving figured out above, leaving 22 per cent. as the net annual returns on the money invested in an economizer. On this basis the net annual return from an investment of $5,000 amounts to $1,100. This saving would amount to about $22,000 at the end of 14 years. The economizer would thus not only provide for its own replacement, but would in addition return four times its first cost. All the above assumptions are conservative for the purpose of showing what good investment an economizer is to an owner of a mill.

It will be noted that the above example is figured out for ten-hour operating schedule. In plants operating 24 hours per day, the value of the coal saved per year will be much greater, while the fixed charges on the investment and maintenance of the economizer are the same. Thus, instead of arriving at 22 per cent. net return on the investment, it will even run to 50 per cent. This, of course, is again dependent upon the price of coal.

The above example shows how much an economizer will save in an existing plant. The proposition can be taken up in still another way. Suppose it is desired to increase the capacity of the plant now installed. This can be done by putting in additional boilers,

grates, chimneys, etc., or it can also be done by the installation of an economizer.

As the economizer heats the water before it goes to the boiler, it consequently relieves the boiler of considerable work, and it can be figured that in plants where the economizer saves 10 per cent. of the fuel bill, it would increase the capacity of the boilers by an equal amount, provided they were forced at the same rate as before. This is better than adding more boilers, as economizers cost only about half as much as boilers per square foot of surface, and at the same time generate power from heat which would otherwise be wasted.

Furthermore, the cost of attendance and maintenance on an additional boiler plant is of course considerably higher than on an economizer. From these figures it will be seen that if it is desired to increase the capacity of a boiler plant by only 10 or 12 per cent., it is much cheaper to do this by means of an economizer than by installing additional boilers. If the additional power desired is more than 10 per cent. that already installed, it will then be necessary to install more boilers. In a case like this, part of the additional load can be carried by economizers and the amount of boiler surface that would have to be installed will be greatly reduced.

STEAM TURBINES.

Concerning the choice between steam turbines or piston engines for power in mill plants, F. W. Dean, of Boston, says in a recent paper:

"There is no doubt that where electricity is to be used the turbine should be chosen. It is fully equal, if not superior, in economy to the piston engine. It requires less room, less foundation, less oil, the wear is almost nothing, and the fact that oil is not used in the steam renders it practicable to use condensed steam for feed water. This is of great advantage in bad water districts, and means freedom from boiler difficulties, and the absence of water purification devices.

"The turbine does not lend itself to belt driving, and in cases where electricity is not desirable the piston engine will hold its place. Such cases are mills where nearly all of the machinery operates simultaneously, as in textile mills, and in which there is an opportunity for simple direct drives by belts or ropes. In this case the cost of installation and of fuel is less than by any other combination. Where there are tools or machines that operate intermittently the electric system is advisable, and, in my opinion, direct current is to be preferred to alternating on account of the absence of power factor troubles. In many cases, however, it is not practicable to use direct current on account of the length of transmission. In some machine shops I have known the power factor to be as low as 60 per cent., which means that the generator will give only 60 per cent. of the power that it would give if the power factor was 100 per cent., which it would be if it was carrying a lighting or an electrolytic load. The other 40 per cent. takes the form of a wattless current which has no capacity to do work, and which vibrates back and forth between the generator and motors, having no effect except to heat the generator, wires and motors. The wattless current, I understand, does not consume or waste power, except the equivalent of the heat generated. In chocolate factories the power factor I have found to be about 70 per cent. In any factory where the load is intermittent the power factor will be low.

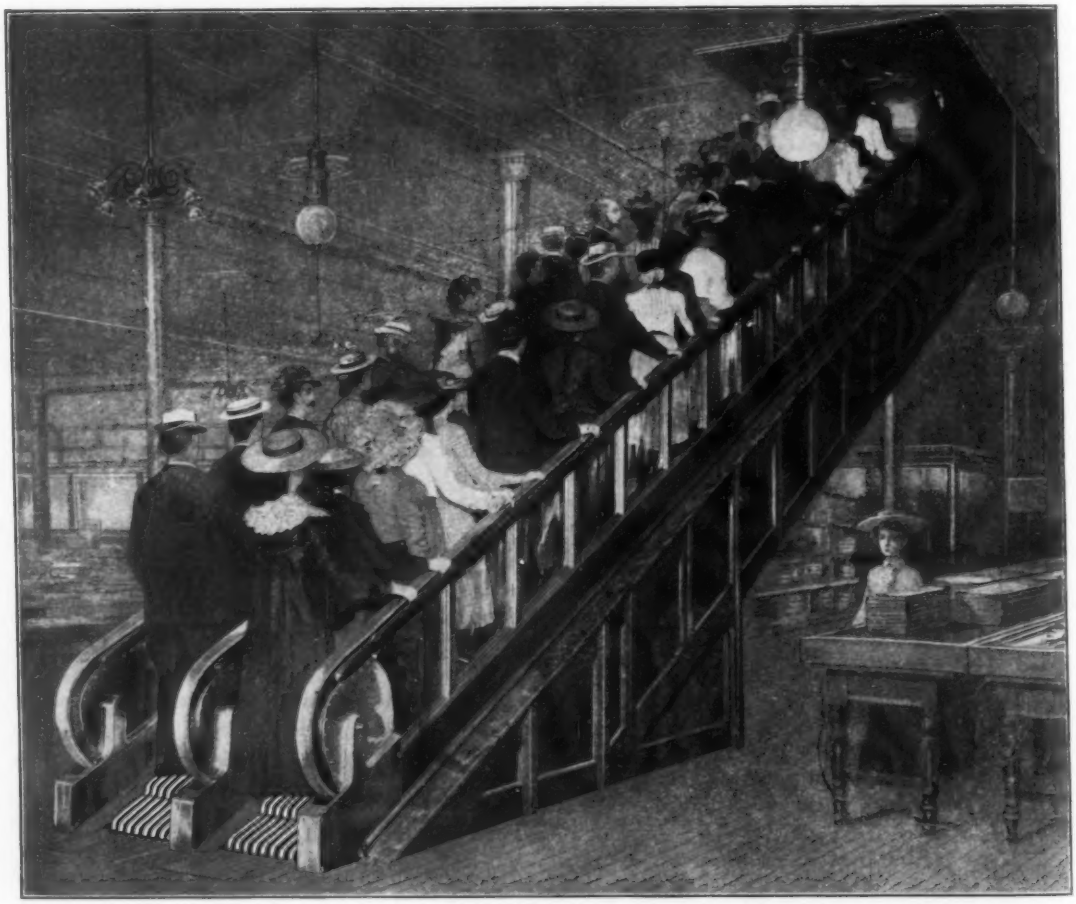
"In regard to the reliability of turbines I know of a 500 k. w. turbine that has run 24 hours per day without stopping for 11 months. It was stopped for general examination and showed no sign of wear. Nine cents were spent for repairs, and it was then started again. It then ran 14 months, 24 hours per day, without stopping, and is now stopped for connection with a new switchboard. It will be examined, but the only known defect is slight leakage of a valve. Another turbine in the same house has made one run of three or four months and one of one month, both without stopping. It has not been used as much as the other because the other kept going.

"In very large central power stations nothing but turbines should be given the slight-

est consideration, for they are the cause of the wonderfully low cost of power for the reasons above stated, which appear in such cases in maximum form."

THE RENO INCLINED ELEVATOR.

The use of inclined elevators or moving stairways for carrying the employes of textile mills between the various floors is one of the latest ideas to be put in practice by the Farr Alpaca Company of Holyoke, Mass., in their new mill. The elevator, installed by the Reno Inclined Elevator Company, 555 West 33d St., New York City, N. Y., is similar to those in operation in the Boston subway and shown in the illustration. This machine will carry by actual test 7,500 passengers per hour, or about 120 passengers per minute either up or down. The object of the installation is to do away with the labor of climbing up and down stairs, and thus make the upper floors of a mill more accessible to the employes. In this way the strength of the operatives is saved and the top floors made as desirable as the first floor to all the workers. This is an important advantage as every mill owner understands the advantages of the upper floors as regards increased light and air.



THE RENO INCLINED ELEVATOR.

The cost of operating the elevators is so

small that it is hardly worth considering. For example, in the test made by the Boston transit commissioners a double file moving stairway of the type shown in the illustration carried passengers at the rate of 500 for one cent for power for an elevation of 21 feet. Bringing the passengers down requires practically no power, and a machine, therefore, which can be reversed makes a very economical device for saving the labor of climbing stairs. The Reno Company has installed a large number of these machines in department stores, elevated railway stations and subways, but it is only recently that they have taken up the question of equipping textile mills with the device. Some of their machines have been in operation for 12 years at only a nominal cost for maintenance and they show very little wear or depreciation during that time.

FIG. 1. THE SELAS LIGHT.

The Reno inclined elevators have carried hundreds of millions of passengers without an accident and in fact it is hard to see how an accident or injury to the passenger can occur. They are operated by electric motor and provided with an electric brake, which in case the current is interrupted immediately brings the machine to a standstill. They can be started and stopped by turning a switch and are in every way under perfect control.

The moving treads are carried upon antifriction wheels and the moving hand rails are made of steel chains with a special moulded rubber covering, producing a very neat and effective arrangement. All the design and mechanical parts are the result of years of experience in building the machine, so that there is no question of their great utility and enduring qualities.

The Reno Company also build a special line of inclined elevators or carriers for handling goods and material in process.

THE SELAS LIGHT FOR TEXTILE MILLS.

Selas light is a new system of gas lighting which has been introduced in German and English textile mills with very great success. It is an incandescent light with special advantages for textile mills. The cost of lighting with the Selas light is 70 per cent. less than with ordinary gas light. The mantles for Selas lamps are very small and being well suspended they can stand vibrations better.

FIG. 2.

The mantles are sold at a low price and have to be renewed only once a year. If the lamps are exposed to heavy jars and vibrations an anti-vibrator can be used which takes up all motions without transferring them to the

lamp, and can be moved freely by the workman at a machine or table. Fig. 1 illustrates a lamp of 80 c. p. equipped with an antivibrator.

In some departments of textile mills the air is full of dust from the fiber. In order to keep this dust out of the lamps a well designed dust preventer is provided for. Selas light has many qualities which make it especially desirable for textile mills. It is white like daylight and colors can be matched without difficulty. The intensity of light is always constant, it does not change by

ANOTHER TYPE OF THE SELAS LAMP.

fluctuations of the gas pressure because it is independent of the pressure in the gas main. The supply of air for a complete combustion of the gas is secured and consequently there is no deposit of carbon, either in the lamp or in the mantle. Fig. 2 shows a larger lamp of 300 c. p. capacity. The system can be installed without interruption of the service.

The Selas Company has made mill lighting a specialty and is pleased to give the mill owner the full benefit of their experience. The company also furnishes a most reliable and economical gas singeing apparatus which has been in successful use for many years. The combustion of the gas is complete and no deposit of carbon or soot is possible. The length of the flame is steady, the heat not excessive and much less than in the old burners.

Further information and prices will be supplied by the company, which has established quarters at 90 West St., New York, where the light can be shown.

HIGH BOILER ECONOMY UNDER FLUCTUATING LOAD.

That a combined efficiency of over 75 per cent. can be obtained under ordinary operating conditions with automatic stokers under water tube boilers was again demonstrated by a recent test at the Middletown, Ohio, mill of the Wardlaw-Thomas Paper Co. The boiler under test was a Stirling 407 h. p. unit with 4,074 sq. ft. of heating surface, fed by a Taylor gravity underfeed stoker. Island Creek coal of a heating value of 13,900 b. t. u. per pound was the fuel, its proximate analysis being as follows: moisture, 1.5 per cent.; volatile matter, 21.9 per cent.; fixed carbon, 70.55 per cent.; ash, 6.05 per cent.

Steam is carried at a pressure of about 105 lbs. with no superheat, and the heaters deliver the feed water to the boilers at a temperature of about 160° F.

The test took place on July 6, 1910, and was continued for eight hours in order to minimize the chance of error. No attempt was made to keep the output constant and a noticeable feature of the results is the fact that unusually good economy was obtained notwithstanding a variation in load from rating to 78 per cent. overload. This remarkable flexibility is due to the combined air and coal control peculiar to this type of stoker.

The principal results are tabulated below:

Coal fired per hour	lbs.	1,712
Dry coal fired per hour	lbs.	1,686
Actual water evaporated per hour	lbs.	17,079
Equivalent water evaporated per hour	lbs.	18,667
Factor of evaporation		1.093
Equivalent water per lb. coal fired	lbs.	10.90
Equivalent water per lb. dry coal fired	lbs.	11.09
Equivalent water per lb. combustible	lbs.	11.80
Equivalent water per lb. sq. ft. h. p. per hour	lbs.	4.58
Boiler horse power (mean of test)	h. p.	541
Per cent rating	%	133
Boiler horse power (Max. hour)	h. p.	725
Per cent rating (Max. hour)	%	178
Combined efficiency	%	76.1

TURBO-HEADS APPLIED TO PICKERS ON COLORED AND BLEACHED WORK.

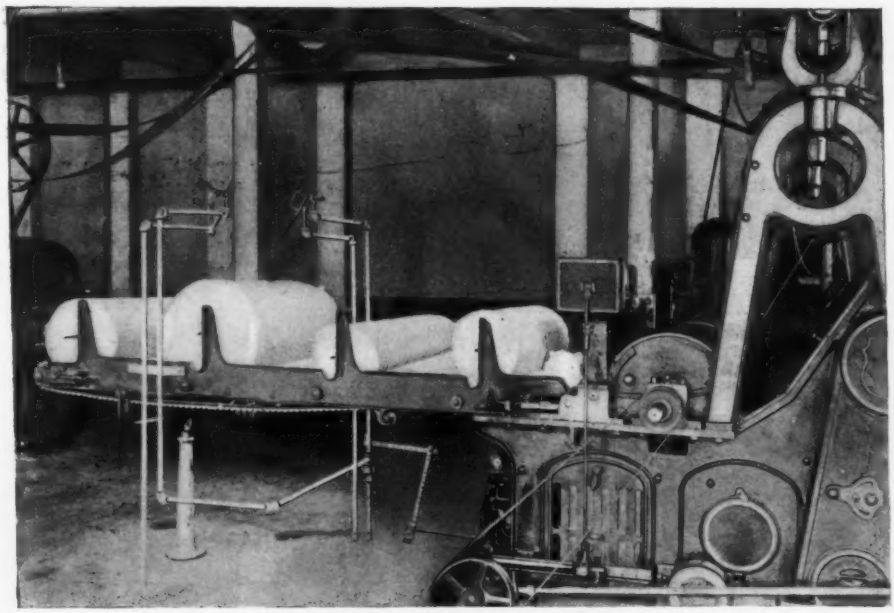
In carding cotton that has been dyed or bleached in the raw stock, there is usually trouble unless it is stored a few days and allowed to age so as to regain the natural moisture which it loses in the drying process. Sometimes the loss in weight in drying is as much as 4 per cent.

When it is necessary to run the stock direct from the dryer various expedients are resorted to, such as sprinkling the cotton with water, steam jets under the apron of the intermediate and finisher, and sometimes softeners are used, or a solution of Glauber salts is sprinkled on the cotton before it is picked.

Much depends upon the atmospheric conditions of the room. In damp weather the cotton will run without much trouble, but on dry days, when there is little moisture in the air,there will be trouble, depending more or less upon the character of the dyeing or the bleaching. The bleached stock in many mills causes more trouble than dyed stock.

Some mills have their opening and picker rooms as well as the card rooms equipped with humidifying apparatus, and to some extent overcome the troubles that way, but the ordinary arrangement of such apparatus does not seem to overcome the difficulty so readily or in such a specific way as the installation which we recently saw in a large Fitchburg mill.

In this mill two Turbo-Humidifier heads were arranged as shown in the illustrations directly over the intermediate and finisher pickers. The piping does not at all interfere with the accessibility to the machine. An automatic valve is so arranged that when the picker stops the valve shuts off the spray and there is no danger of soaking the laps. The moisture can be regulated as desired and clear water or a solution of Glauber salt or common salt used in the spray, as the tank which supplies these heads is separated from the main system, although the same compressor supplies the necessary power. With this arrangement, it is found perfectly feasible to run the bleached stock directly from the drier, as the cooling and moistening effect of the vapor restores it to its natural condition and makes it run as well as natural cotton, not only in the card-



TURBO HEADS APPLIED TO PICKERS.

ing, but through the drawing and spinning.

The G. M. Parks Co., of Fitchburg, Mass., who made this installation, inform us that several other mills which are equipped with the Turbo-Humidifying system are making similar special installations for this particular purpose, owing to the satisfactory results that have been obtained. While it probably would not pay a mill to make a special Turbo installation for this purpose unless already using the Turbo-Humidifying system, those mills which are equipped with this system can very readily adapt it in this way without much additional expense and from the results being obtained in the mill in question it would seem to be well worth while.

IMPROVEMENTS IN WOOL COMBING.

The American Textile Machinery Co., 185 Summer St., Boston, is now putting on the market improvements in worsted combs upon which they have been working for several years.

The important feature of their devices is the doing away with fluted rolls and leather aprons. They also claim that the devices largely increase production and reduce the amount of noil, giving a superior top. In some instances it is claimed to be able to do away with the second gilling.

Another improvement is a new dabbing motion which does away with brushes and which can be adjusted for any class of wool from Australian to coarse and wiry qualities. This motion is run at slow speed, usually one-half brush speed, and therefore stops the vibration of the circles, although not curtailing production.

Among other patented improvements they make a device which adjusts the rolls to the sliver, whether it is thick or thin, by simple adjustments that are made with the fingers, doing away with the spiral spring and monkey wrench. They also dispense with the star wheel, substituting a simple device which points all the fibers of the wool directly to the drawing roll, not allowing any to escape or get crossed.

These improvements and attachments have been made to combs in a number of prominent worsted mills in this country as well as abroad and have been running for some time. At the company's office a comb, fully equipped with all improvements, may be seen in operation by appointment.

MOTOR DRIVE IN COTTON MILLS.

BY JOHN W. FOX.

Rapid progress in the application of electric motors to textile machinery has placed a variety of interesting problems before the engineers who are engaged in this work. The electrification of a plant that was primarily designed for steam drive is not a simple problem if all the factors of convenience and economy are given the proper degree of consideration.

Consideration of the relative merits of group and individual motor drive is not al-

FIG. 1.

ways of primary importance. For example, in making the change from steam to electricity, not many of the cotton mills in the Carolinas have been able to eliminate more than 3 per cent. of the old shafting and belting, thus necessitating group drive. This condition is due to the fact that most of the mills using electricity have what is called a "secondary" contract for power, guaranteeing the supply of power for only a part of the year. These plants have to fall back on their steam reserve when low water shuts off the external source of power; hence it is necessary to leave the shafting plan undis-

turbed so that all shafting can be quickly recoupled to the head of the jack shaft as soon as circumstances demand.

Hydraulic power companies depending on water storage reservoirs frequently make short term contracts for supplying power at low rates during periods when water is plentiful. In such cases the power supply is guaranteed for a portion of the year only, but it is never shut off until low water compels curtailment. The purchaser of this so called secondary power must maintain a steam plant to insure continuous operation of his plant when the electric power is shut off. Since the power company naturally continues the supply of electric power as long as possible, the purchaser invariably receives power from outside longer than called for by his contract.

The Chadwick Hoskins Mill No. 2, in Charlotte, N. C., was one of the first textile mills to make a contract for secondary power with the Southern Power Company; while the contract covers a period of only six months, the mill had to resort to its reserve steam plant only 6 1/2 days during a period of eighteen months. The rate for secondary power being low, the mill has had the advantage of very cheap power.

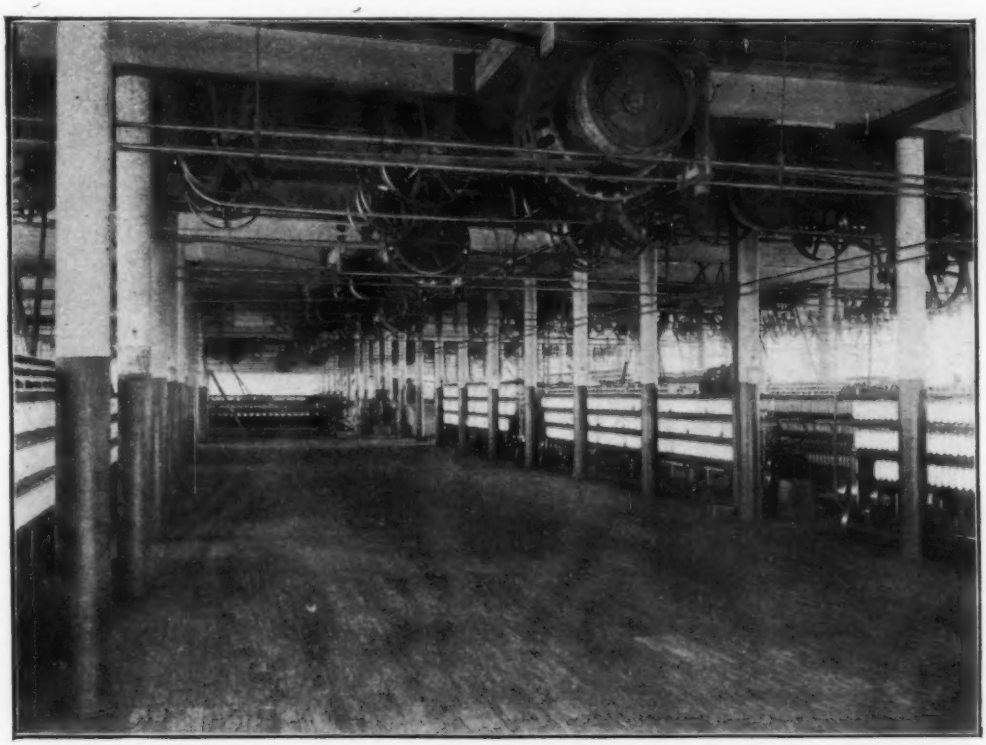


FIG. 2

The power is brought to the sub-station, shown at Fig. 1, where it is stepped down from 44,000 to 2,200 volts. The equipment in thus sub-station consists of three 1,000 k. w. oil insulated water cooled single phase transformers, 44,000 to 2,200 volts; one three pole, single throw, type G circuit breaker of 300 amperes capacity, a small motor driven pump supplying water to the transformers, and a switchboard consisting of incoming and distributing panels. Lightning arresters of the electrolytic type are erected outside the station. The entire

equipment was made by the Westinghouse Electric & Mfg. Company. This station supplies power to the Hoskins mill, to another 10,000 spindle mill, various cotton gins, and the town of Paw Creek, three miles distant. The 2,200 volt, 3 phase, 60 cycle line enters the mill wall through an iron conduit. The switchboard in the mill consists of the main or incoming panel and several other panels for the control of the motors in the three departments in the mill, carding, spinning and weaving.

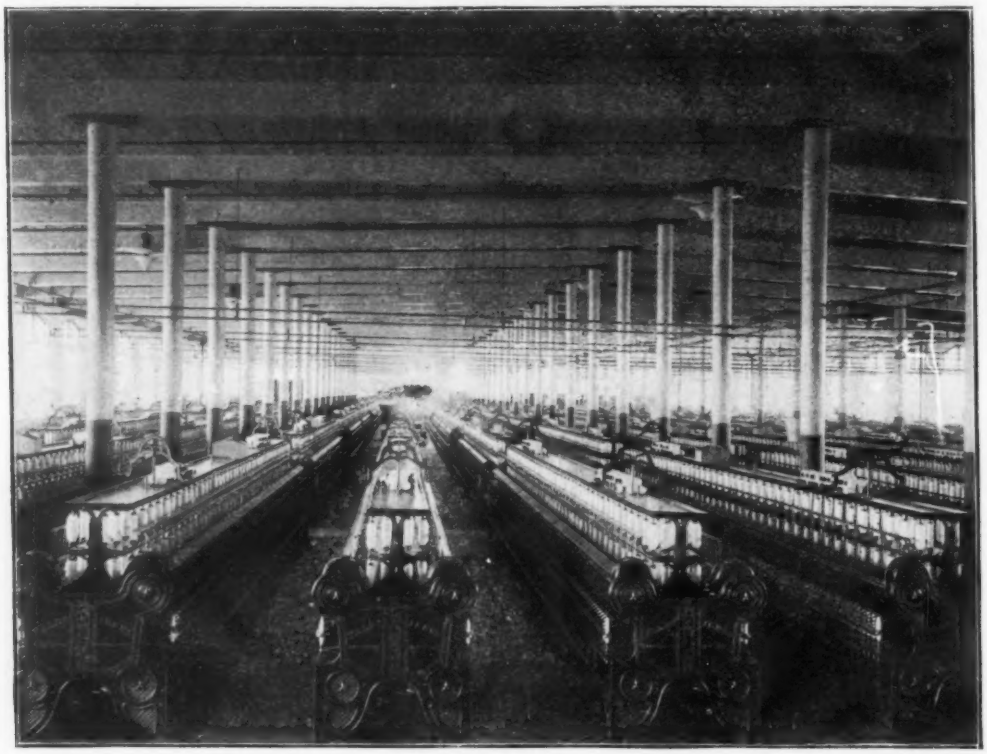


FIG. 3.

The Hoskins mill contains 25,000 spindles and 600 looms, all devoted to the manufacture of fine sheetings. The spinning frames are on the third floor, the cards and speeders are on the second floor, and the looms are on the first floor. The mill was originally steam driven, but it is now equipped with about 900 h. p. in Westinghouse 3 phase, 60 cycle, CCL motors. The 2,200 volt cables are carried in an iron conduit to each motor. The auto starters are mounted on the wall behind the panels. The line of primary and secondary busses are erected over the three-pole, double throw, automatic, oil circuit breakers and connected to them; the busses and circuit breakers are then neatly boxed in, with a door on the end for access to the switches.

In the card room the motors are hung from the ceiling over the cards and drawing frames. The spinning room on the upper floor is driven from this room, the belts to the spinning frames passing up through the floor. By putting up about 35 feet of new shafting with the necessary hangers and pulleys it was possible to eliminate the entire length of the main shaft in this room, the new shafting taking the place of the heavy mains and permitting direct belting to the motors. Fig. 2 shows the motors in the

card room, driving spinning frames above and speeders below. There are 3 slubbers, 4 coarse, 8 intermediates and 24 jack frames. The spindles run from 1,000 r. p. m. on the coarse frames to 1,600 r. p. m. on the fine frames. All motors have center flanged paper pulleys and run at full load speed of 850 r. p. m. As before stated, all the main line shafting was uncoupled and left "dead," yet ready to be recoupled in case of necessary recourse to the steam drive.

Fig. 3 shows the spinning room with a total of 25,600 spindles. There are 50 frames of warp and 50 frames of filling, each frame having 256 spindles per frame. The production is 54s and 60s warp, and 50s and 80s filling. As above mentioned, these frames are driven from the card room below. This results in a light, clean room. The same result would be obtained if the frames were driven by individual motors.

Fig. 4 shows a section of the weave room drive. This room contains 600 looms, 40 inches wide, producing sheetings of 80 by 72, and 96 by 100 construction, warp and filling on the latter being 60s and 80s, goods measuring 6.80 to 7.75 yards respectively. All line shafts in this room weft left intact, excepting the section coming through the wall from the main drive. The first coupling was "broke" and a hanger put up to support the end of the first length of the main shaft. The motors were belted both ways to eliminate as much counter belting as possible and thus get the benefit of "initial power" on each line shaft.

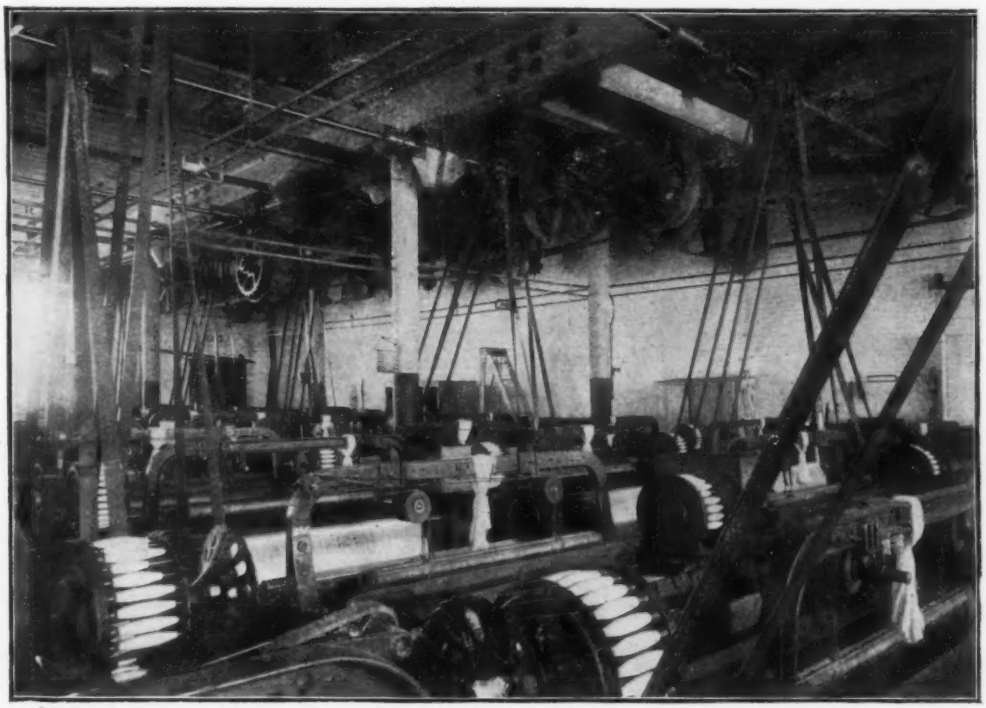


FIG. 4

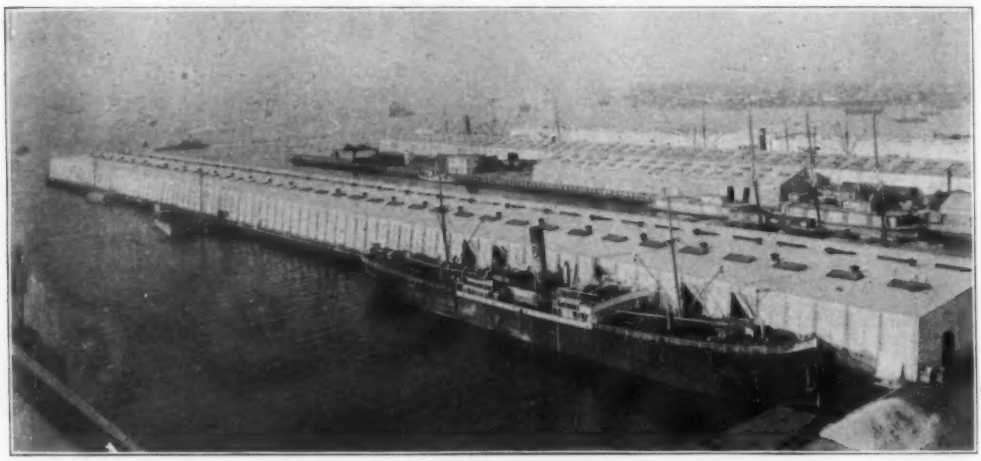
The cost of equipping this mill with motors, belting, pulleys and wiring was $13,000, or about $13 per h. p. When operating the steam plant, the indicator cards showed an average of 850 h. p.: with the electric motors the indicating wattmeters show about 10

per cent. less. The mill management desired to retain the previous rate of production, and a special effort was made to retain the same speeds on shafting with the electric motors as was made when operating by steam. As a result, the production is about the same, but the power consumption has decreased; this was undoubtedly due to the care taken in the motor installation.

There are still a great many manufacturers who look at the first power cost and make comparisons on a h. p. basis. This reasoning is manifestly wrong, because it has been demonstrated beyond a doubt that a change from steam to electric power results in an increased product; many prominent mill men are willing to go on record that the change resulted in an increase from 3 to 10 per cent. As the average power cost per pound of product is about 5 per cent. (depending on the kind of goods manufactured), the mill management (to use the words of a prominent New England agent) "would be justified in doubling the power cost if a gain of 7 per cent. could be made." This gain is often made when a change from steam to electric power is made, due to the more constant and even speed of the motor drive compared with the engine drive.

THE BUSH TERMINAL.

Keen competition in the textile branches has made the question of increasing profits almost secondary to that of effecting common sense economies. The products of the industry being to a great extent necessities, wasteful methods are not only ruinous to the manufacturer but to the consumer as well, and therefore the foremost representatives of the trade have of late turned their attention to the problems of trucking and insurance as two items which, while they seem to result in the greatest outlay with the smallest returns, offer the best opportunities for reforms.



VIEW OF THE BUSH PIERS AND WATERFRONT.

For this reason many dry goods merchants are evincing great interest in the commercial developments of South Brooklyn where, with the aid of the Bush Terminal Company, manufacturers and wholesalers are conducting their shipping operations without the cost and troubles of intermediary cartage, and where insurance rates have been reduced to a minimum.

In New York City proper, as in all great commercial centers where manufacturing, wholesale and residential districts have outgrown their original confines and are overlapping each other, the freight transportation

problem is serious. Miles of congested streets separate the best known and oldest wholesale sections from the piers, the railroad depots, the warehouses and factory locations, and other miles of congested streets separate these from each other. The waste in cost of labor represented in trucking, in loss of time, and in breakage in city transit, runs into millions each year.

One large textile corporation, which moved from the old dry goods district to South Brooklyn, reported after a time that it had effected an annual saving of $13,997. How was it brought about? A bird's-eye view of the Bush Terminal will serve as explanation. The waterfront along the Government channel is lined with great piers designated to offer wharf accommodation to the freight steamers which bring from and carry to all parts of the world, the goods which form the basis of our commerce. Back of these piers is an extensive series of fireproof warehouses, where merchandise not required for immediate use can be held, and behind these warehouses is located a great union railroad terminal where cars for every road reaching the city await the freight from steamship or railroad. Here "the land carrier meets the ocean-borne commerce" and in order to establish direct connection between the two, the company has established a private terminal railway, the tracks of which extend into every corner of the plant.

Back again of the railroad terminal is located the keystone of the whole plant—the chain of great factory and loft buildings of steel and concrete, where the merchants can manipulate and distribute the crude or manufactured products brought to their doors by the steamships and railroads. Underlying it all is a network of pipes and wires controlling a double system of fresh and salt water fire sprinklers, steam for manufacturing and heating, and electricity for power and light. Farther back, we find the boundary line of Third Avenue, and then a series of model tenements erected by President Irving T. Bush, for the purpose of concentrating and systematizing the labor market of the section, and offering the workers in the loft buildings the advantages of modern and sanitary homes of a kind which it is absolutely impossible to find in other wholesale districts of the city.

The loft buildings are the key of the entire plant. Incidentally, they furnish the solution to the problems referred to above,

IRVING T. BUSH, PRESIDENT BUSH TERMINAL CO.

with which the textile trades are confronted. These structures are about 700 by 75 feet, six stories high, and contain on an average 375,000 square feet each. The various floors are capable of sub-division into minimum spaces of 5,000 square feet. It is more than interesting to watch the methods by which tenants take advantage of the opportunities offered them. Out-of-town shipments are received at the doors of the lofts in the original cars. There is no unloading and loading

into trucks at the pier or in the railroad yard, there is no carting through crowded city streets to the consignee. He receives his goods as they are sent from the East or West, the South or from Europe—and he has not paid a cent in excess of the regular New York freight rate, because the Bush Terminal Company is the accredited terminal agent of all the roads reaching its yards—and all the roads reach it.

The reverse process is followed in the case of outgoing merchandise. The tenant wishes to make a shipment to another city, or several shipments to various and widely separated points. As soon as the goods are packed, he notifies the Bush Terminal Company, his landlords. A car is waiting at the platform below by the time the goods are ready to go down the elevator. The moment they are taken from the tenant's floor, his responsibility for them ceases. The Bush Company is responsible for them until they are stored away in the car waiting below, and then the railroad assumes the responsibility. A powerful electric engine draws the car out from between the loft buildings, across the freight yards, and the shipment is under way. If it is a shipment by water, the Bush Terminal railway establishes the connection between the pier and the loft.

Allusion was made above to a saving of $13,997, recorded in one year by a prominent firm. These figures were furnished by Messrs. Faulkner, Page & Co., who are among the Bush tenants. In a statement signed by Mr. Edward D. Page, the company says:

Below you will find a comparison of our expenses for storage based on the actual figures of the year 1907 and the actual status today. The insurance given in the 1910 column was the actual disbursement for the year 1909, as is also the amount of saving on cartage which, however, has been saved to our consignors rather than to ourselves.

	1907.	1910.	Saving.
Labor	$9,750	$4,732	$5,018
Rent	13,275	9,780	3,495
Insurance	8,912	3,252	5,660
Cartage			668
Total			$14,841
Less extra expenses viz:			
Private telephone line..			$498
Messenger service			346
Total			844
Net saving annually			$13,997

If one firm can effect savings like these by simply changing the location of its warehouse and shipping rooms from one district in the metropolis to another, it stands to reason that others are inclined to study the situation closely and to consider the advisability of following suit. It is the general impression throughout the trade, and in many other industries as well, that modernism in shipping operations must sooner or later take the place of antiquated methods, and the Bush system is one of the latter-day forms which seems to be crowned with success. President Irving T. Bush, of the Bush Terminal Company, who has made a close study of the situation, is convinced that a change is imminent and in discussing present conditions he said:

The evil is glaring and every merchant is aware of it. There is hardly a large business house in New York City which could not reduce its operating expenses if commercial traffic congestion were not a fact. There is a deal of traffic in the streets of New York, and in those of other industrial centres, which does not belong there. If every truck moving over the circuitous route of Manhattan to a railroad or steamship terminal were removed, the remaining traffic could be easily handled. It seems to me that a great deal of the freight coming to Manhattan could be diverted. Freight in transit could very properly be sent to outlying points about New York direct from car to car or from boat to car. When we consider the great obstruction formed by every truck, and the comparatively small volume of goods that one truck can carry, and its relation to the very much larger capacity of the steamship or railroad floats, it would seem that there is a waste effort and a neglect of opportunity somewhere.

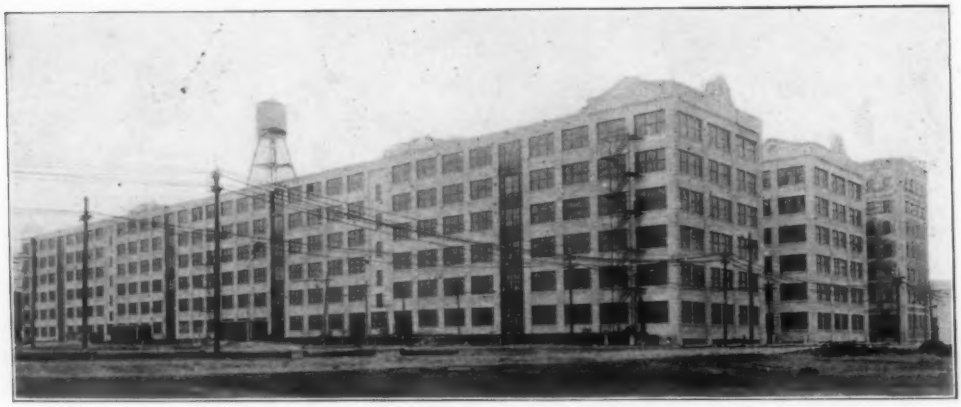
One of the principal causes for all this trouble grows from the fact that the land back of and about the piers is not being properly utilized. The mistake was made in the past. Erastus Wimans once likened South street on the East River, and West street on the North River, to a girdle strangling the commercial life of New York. This may be an extreme statement, but the cutting off of the waterfront from the uplands by a broad public thoroughfare has made it impossible on the one hand to establish along the Manhattan shoreline suitable facilities for ocean-borne freight commerce and, on the other, to reach it without in-

TRAFFIC CONGESTION AT THE MANHATTAN TERMINALS, PRODUCED BY INADEQUATE SHIPPING ARRANGEMENTS.

terfering with the traffic that properly belongs on the streets. It seems to me that the proper way to eliminate many of these evils lies in the utilization of the land behind the piers. Railroad yards, warehouses, factory and loft structures, should be located close together. It is impossible, of course, to place these various shipping and commercial agencies at the head of the majority of the piers in Manhattan, because the land is otherwise employed and the suggestion to raze the buildings

A TYPICAL BUSH LOFT. THE DETMER WOOLEN CO.

FREIGHT TRAIN BACKING UP AT THE DOOR OF A BUSH TERMINAL BUILDING.



A VIEW OF THE BUSH LOFT BUILDINGS.

now standing there would naturally and properly be ridiculed. But there is no reason why newer locations should not be developed along better lines. In developing the Bush Terminal plant, I have had the present troubles of Manhattan in mind, and have endeavored to create a system which will minimize, if not eliminate, all waste effort and expense in shipping.

Every time a merchant finds that his goods are unduly delayed in transit through the city, despite ruinous charges paid for their transportation, he involuntarily wishes that his plant were located in a more favored spot. If things get so bad that he finally decides upon moving, the city stands in grave danger of losing one of its valuable assets.

PORTION OF THE BUSH TERMINAL CO.'S UNION FREIGHT RAILROAD YARD AND SOME OF THE NEARBY FIBER STORES.

If he moves to the new section in South Brooklyn, New York has not only suffered no loss, but has become a gainer by reason of taking an obstruction away from the streets of Manhattan. If, on the other hand, he moves to Jersey, the city has lost in taxes, in credit and in reputation. It stands to reason, therefore, that the development of outlying districts, like the South Brooklyn section, offers the only remedy, not only for New York, but for all port cities similarly located and harrassed.

The imports of wool into the United States for the manufacture of carpets amounted to 136,220,511 pounds valued at $16,706,728 in 1909, or more than double that imported in 1908. The increased importation has continued in 1910, amounting in the first four months to $5,203,876, against $4,827,022 in the same period in 1909, and $1,993,843 in the 1908 period.

A CARTHAGINIAN LAMP WICK.

The interesting deposit of antiques disclosed by the excavations from the sea bottoms made under the direction of archaeologist Merlin off the coast of Tunis include a large number of objects of daily use, among which is a Carthaginian lamp provided with a wick. The "Deutsche Zeitung" refers to the discovery as follows: This wick which dates from the 2d century B. C., has been carefully examined and it has been determined beyond question that it is made of flax fiber. Thus a question which has long engaged the attention of archaeologists is solved. The question of what kind of material the wicks of antique lamps were made of has long puzzled investigators, who have advanced various theories in regard to them, including the claims that they were made of elder pitch, oakum, payrus and the hair of animals. Now it is established beyond question that in old Carthage the lamps were equipped with wicks made from the flax fiber.—"Deutsche Wollen-Gewerbe."

The imports of wool into Havre, France, for 1909 were 10,497 bales as compared with 26,770 bales in 1908, 26,128 bales in 1907, and 38,841 bales in 1906.

Mill News

Those interested in receiving early and more complete investigated information of projected new mills, enlargements, improvements, fires, facts and gossip of the trade are referred to the TEXTILE ADVANCE NEWS, issued weekly by the publishers of the TEXTILE WORLD RECORD, at $15.00 per year.

See pages in advertising section for other Mill News.

COTTON.

New Mills.

Georgia, Monticello. An architect has been engaged to prepare plans for the Jasper Cotton Mills. As noted previously, this will be a 10,000-spindle mill.

*Massachusetts, Fall River. Contract has been awarded by the Charlton Mills for power equipment which will include a cross compound steam engine to be used in operating the main mill and a low pressure turbine of 850 h. p. to be used in developing electrical power for operating the weave shed, elevators and for some of the spinning. It is proposed to operate the turbine engine with the exhaust steam from the main engine. Construction work is progressing rapidly. The original intention to finish the weave shed first has been abandoned and the spinning mill, engine house and storehouse are being constructed first. It is now proposed to get the machinery in operation in the spinning mill and have this department running smoothly by the time the weaving department is ready for yarn.

North Carolina, Chapel Hill. The T. F. Lloyd Mfg. Co., incorporated several months ago with capital stock of $200,000, has organized with Thos. F. Lloyd, president; Louis Lloyd, vice-president; W. S. Robinson, secretary, and J. W. Pritchard, treasurer. At the time the company was incorporated it was said a cotton yarn plant of 10,000 spindles was proposed. Thos. F. Lloyd was formerly proprietor of the Alberta Cotton Mills and Mr. Pritchard was president of the Blanche Hosiery Mills, formerly operated as separate plants, but which were later taken over by the Durham Hosiery Mills and are operated as Durham Hosiery Mills No. 4.

*North Carolina, High Point. Contract for the erection of buildings for the Pickett Cotton Mills has been awarded to the Central Carolina Construction Co. of Greensboro, North Carolina. As noted previously, the plant will have 12,000 spindles and 300 looms to be operated by electric power from the High Point plant of the Southern Power Co. Lockwood, Greene & Co. of Boston, have prepared plans.

*North Carolina, Salisbury. C. C. Adams has been elected president of the Hambley Mfg. Co. and Gilbert F. Hambley, treasurer and manager. A 50-loom damask plant is being constructed and will be in operation about January 1, it is expected. The company has authorized capital stock of $125,000.

*North Carolina, Smithfield. As noted in an earlier report, construction work has been completed on buildings for the Ivanhoe Mfg. Co. 5,120 spindles and accompanying equipment for manufacturing yarns will be installed at first, although there is space for double this amount of machinery.

*North Carolina, Thomasville. Machinery equipment has not been installed as yet in the Jewel Cotton Mills, but they hope to begin this work soon and to start manufacturing before Dec. 1. As noted in an earlier report, fine combed cotton yarns will be the sole product. The capital stock of this company is $100,000. J. L. Armfield is president; T. J. Lillard, treasurer, and C. H. Boyd, superintendent. The plant will be operated by electric power and 6,048 spindles will be the equipment.

*South Carolina, Chesnee. Contract for construction work for the Chesnee Mills has been awarded to the Fiske-Carter Construction Co. Track to be used in hauling the building materials to the site is in progress and excavating for the foundation is well under way. W. E. Burnett, president of the First National Bank of Spartanburg, is president and treasurer, and J. N. Cudd, also of Spartanburg, is vice-president and general manager.

*South Carolina, Laurens. Efforts are being made to complete organization of the Connemara Cotton Mills Co. and arrange details of plant in the next few weeks. The company was chartered with capital stock of $400,000 in July. J. Adger Smith, Jr., president and treasurer of the Watts Mills, is the leading promoter of the Connemara Cotton Mills Co.

*South Carolina, Newberry. W. H. Hunt has been elected president of the new Oakland Cotton Mills, John M. Kinard, vice-president, and F. N. Martin, secretary. Twenty per cent. of the capital stock has been called for October 10 and as soon as this is in, application will be made for a charter. They expect to begin manufacturing when the next cotton crop is ready. Plans of this company have been reported previously. A 20,000-spindle and 600-loom mill to be operated by electric power on print cloths will be erected.

*South Carolina, Prosperity. Plans for the proposed cotton mill will probably be completed at an early date as considerable capital has been subscribed, sufficient it is said to organize a $200,000 company. Dr. J. S. Wheeler will be president and will have associated with him in the enterprise Dr. Geo. Y. Hunter, president of the Bank of Prosperity, and W. W. Wheeler, president of the Peoples' National Bank. A 10,000 spindle mill is projected.

*Virginia, Martinsville. By Oct. 1 the Martins-

ville Cotton Mill Co. will begin manufacturing cotton sheetings with 18,000 spindles and 446 looms. This company was incorporated last June with authorized capital stock of $525,000 and has erected a main building 4 stories high, 140 by 200 ft., 2 storage warehouses, 100 by 150 ft., 1 story high, steam and electric power plant, etc. Z. T. McKinney is president and R. L. Walker is treasurer and buyer.

Enlargements and Improvements.

Alabama, Florence. A 250 h. p. steam engine is being installed in the Ashcraft Cotton Mills and the plant will resume manufacturing as soon as the engine is ready.

*Canada, Ontario, Cornwall. In addition to installing a cop dyeing plant of 30,000 pounds weekly capacity, the Canadian Colored Cotton Mills Co is installing a roving and beam dyeing plant, capable of producing 25,000 pounds weekly, in the Canada Mill.

*Georgia, Fitzgerald. Contract has been awarded by the Fitzgerald Cotton Mills for 140 automatic looms It was rumored several months ago that the Fitzgerald Cotton Mills would add a weaving department to use the yarns which have heretofore been sold. The matter was dropped for a time, but a few weeks ago was taken up again. E. K. Farmer is treasurer and buyer and John H. Mayes is superintendent.

Maine, Augusta. The auxiliary electric power plant of the Edwards Mfg. Co. has been started up. A new addition to the slasher room, 55 by 40 ft., 1 story high, is in progress of construction. Increases have been made in the cotton opening department, picker room and carding room. In addition, five new speeders, 2 slashers, new warpers and new looms have been installed.

Massachusetts, Clinton. Contractors are working on the new mill for the Lancaster Mills. The steel frame for the first story has been completed.

Massachusetts, Lowell. Looms are to be installed in the lower storehouse of the Hamilton Mfg. Co. on Middlesex St., and workmen are remodeling the building preparatory to the setting up of this machinery.

*Massachusetts, Millbury. Repairs at the Holbrook Mills of Edward F. Rice & Co. are being completed and manufacturing will be resumed in a few days.

*Massachusetts, Monson. Repairs and improvements in No. 1 plant of A. D. Ellis & Co., which have been in progress since May, are completed and manufacturing has been resumed on full time. A 2-story brick engine house and a weave room have been added and the entire plant has been put in first class condition.

*Massachusetts, New Bedford. The Dartmouth Mfg. Corp. has awarded contract for the 4-story brick addition to enlarge the storehouse. Work will be started at once.

Massachusetts, New Bedford. The Gosnold Mills Co. will build an enlargement to the carpenter and machine shop of wood construction.

Massachusetts, Newburyport. A new engine is being installed in the Warner Cotton Mills.

*Massachusetts, Shirley. Two of the six looms being installed by the C. A. Edgarton Mfg. Co. were set up this week. Old looms are being replaced by this new equipment.

Massachusetts, Williamstown. The John S. Boyd Co. has completed the installation of new machinery which will increase the production. Corduroys and velveteens are manufactured.

*New Hampshire, Dover. Work on the new storehouse of the Cocheco department of the Pacific Mills is progressing rapidly. It will have capacity of about 20,000 bales of cotton.

New Jersey, Bridgeton. Arrangements have been made by Geo. W. Preston & Co. of Paterson for the removal of their plant to Bridgeton some time during October. They make Turkish towels, face cloths, bath mats and other Terry cloth novelties on 15 looms, selling the product direct and through Nathan & Greer Co., New York. The present equipment is insufficient to keep up with the demand for their products and the new plant will have approximately three times the capacity of the Paterson plant.

New Jersey, Florence. A large brick addition is being built by the Florence Thread Co. and when finished will make a substantial increase in the capacity of the plant.

*North Carolina, Burlington. The new dye house built for the Glen Raven Cotton Mills Co. is ready to start up. Some change is to be made in the lines manufactured by this concern, details of which have not been announced. At present they make colored cotton cloths and 4s to 15s warp yarns for the market on 3,000 ring spindles and 100 looms.

*North Carolina, Durham. Good progress is being made on the addition to the bag factory of the Golden Belt Mfg. Co. This addition will be three stories high, 75 by 120 ft.

*North Carolina, Lenoir. The proposed increase in the capacity of the Moore Cotton Mill Co. is contingent on subscriptions being received for the full amount of the recent increase in capital stock from $80,000 to $150,000. If sufficient capital is interested to enable them to carry through their plans for enlargement, 2,400 additional spindles will be instaled. This will give a total of 5,376 spindles, the amount of machinery for which the buildings were constructed. $91,000 has been paid in common stock and $36,000 of the preferred stock has been subscribed, while additional capital is in sight to bring the total up to $140,000.

Pennsylvania, Reading. Joseph Bancroft & Sons of Wilmington, Del., are making considerable improvement to the Reading Cotton Mills, of which E. S. Jenckes is the manager and Samuel Long the superintendent. 150 new looms are now being installed and new carding machinery is also being put in to take the place of some of the old equipment which is being thrown out. The plant

contains 17,216 ring spindles and with the new installation of looms, 300, which are operated on cotton cloths which are converted into shade and book cloths. The plant is now running one-half but is expected to be in full operation within a short time.

*Rhode Island, Central Falls. Work has been started on the large additions for the Waypoyset Mfg. Co. About a year will be required for the completion of the proposed enlargement, outlined in a previous report.

South Carolina, Bamberg. Machinery equipment to be installed in the Bamberg Cotton Mills has been purchased with the exception of water softening apparatus in which they are interested.

*South Carolina, Camden. Work has been started on the recently reported addition to the plant of the Hermitage Cotton Mills. It consists of an additional story to the present structure and is to be equipped with picking and carding machinery as the equipment of this department has not been sufficient to keep the spinning and weaving rooms running full time. While the work on this addition is in progress, the company will generally overhaul the plant and make some increase in the power equipment.

*South Carolina, Gaffney. Within 30 days the new 2-story brick addition to the Hamrick Mills will be equipped ready for operation. 15,000 spindles and 364 looms are now being installed. In connection with this enlargement, the capital stock was increased from $150,000 to $250,000 last July. Construction work was started on the addition in May.

*South Carolina, Liberty. Contract has just been awarded by the Calumet Mfg. Co. for the new weave shed to be equipped with 200 looms, reported in June.

*South Carolina, Lockhart. The Lockhart Mills have nearly completed the installation of machinery in the new building, and will begin the manufacture of print cloths in No. 1 mill.

South Carolina, Newberry. The Mollohon Mfg. Co. and the Newberry Cotton Mills are negotiating with the Southern Power Co. for electricity to drive their plants. Both mills at present are equipped with steam power plants. The power is to be obtained from the Newberry transmission lines, which the Southern Power Co. is now preparing to construct. It is said about 1,200 h. p. will be required for the Mollohon plant and about 500 h. p. for the part of the Newberry Mills that is to be changed to electric drive.

*South Carolina, Rock Hill. An increase has been made in the equipment of the Aragon Cotton Mills, including 8,000 new spindles and 280 looms, giving total equipment of 22,500 ring spindles and 560 looms. The capital stock is $390,000. Alex. Long is president, treasurer and buyer and A. T. Brown, superintendent. J. P. Stevens & Co., New York, are the selling agents.

*South Carolina, Simpsonville. Good progress is being made by the Simpsonville Cotton Mills on the erection of the additions planned last June. Machinery equipment has been purchased which will increase the plant to 25,088 spindles and 600 looms.

*South Carolina, Yorkville. The York Cotton Mills are now installing 160 40-inch looms, contracted for several months ago. In April the stockholders voted to increase the capital stock from $150,000 to $300,000 and to displace twisters, warpers and reels with weaving machinery.

*Texas, Cuero. While plans for the reorganization and enlargement of the Cuero Cotton Factory have not been completed, it is reported on good authority that the capital stock and plant will be doubled.

Mills Starting Up.

North Carolina, Concord. As noted in an earlier report, the Roberta Mfg. Co., incorporated in June with capital stock of $100,000, has succeeded the Dowell Mfg. Co. of Concord. Manufacturing will be resumed just as soon as the new company can make preparations. 26s to 30s single and ply yarns will be made as formerly on 4,064 ring spindles and 2,000 twister spindles, operated by water and electric power. John C. Rankin of Lowell, president of the Lowell Cotton Mills, has been elected president of the new company; E. F. White of Concord, treasurer. P. M. Keller will remain as superintendent and buyer.

*North Carolina, King's Mountain. At a meeting of the stockholders of the Phoenix Mfg. Co., recently incorporated to take over the plant of the Lula Mfg. Co., organization was perfected and decision made to resume manufacturing at once. J. C. Plonk has been elected president and R. F. Roberts, secretary and treasurer.

North Carolina, Rutherfordton. The Cleghorn Mills Co. has begun manufacturing. This company was incorporated last November and is a reorganization of the old Levi Cotton Mills.

Virginia, Roanoke. About October 1 the Twine Mills Corp. will begin manufacturing. This is the new company which took over the plant of the Roanoke Mills Mfg. Co. and is headed by T. T. Fishburn of Roanoke, and W. C. Ruffin of Mayodan, North Carolina. During the past few weeks the buildings have been overhauled and repairs made and the machinery cleaned and put in good condition. A new boiler has also been installed.

WOOLEN.

New Mills.

*Massachusetts, Lawrence. The first story of all sections of the new merino yarn mill of Wm. Whitman & Co. is completed and on some sections work has been started on the second story.

*Massachusetts, Lawrence. The new mill of the U. S. Worsted Co., on the old flour mill site near the Falls bridge, will be 4 stories high, 75 by 250 ft. J. S. Searles of Lawrence, is the contractor.

*South Dakota, Sioux Falls. Wm. Appleyard,

head of the woolen mill project, is due here October 15 and will begin at once to get the plant in shape and install machinery. There has been a feeling lately that the project has fallen through, but this is not the case, and there is no doubt the mill will be started, as property has been purchased and something done toward getting it in shape for manufacturing.

Enlargements and Improvements.

*Canada, Ontario, Carleton Place. Bates & Innes, Ltd., are equipping the old machine shop, as noted, but they are not increasing their plant, simply moving the felt machinery from the present mill into the machine shop building to relieve the crowded condition.

*Connecticut, Shelton. The addition to be built to the plant of Sydney Blumenthal & Co., Inc., contract for which has just been awarded, is to enlarge the stock and shipping rooms and to give better office facilities. It will be 4 stories high, 50 by 120 ft.

Connecticut, Stafford Springs. A new water wheel has been installed by the Fabyan Woolen Co.

*Connecticut, Stafford Springs. Work is well under way on the new boiler house of the Warren Woolen Co. When completed all the boilers in the plant will be concentrated in the new space. The two upper floors of the mill bought from the Stafford Worsted Co. will be used for weaving, 40 looms being installed on the top floor and 20 looms on the floor below. On this equipment 30 looms are new, as noted previously. The first floor will be used for dressing, spooling and twisting and all the machinery in the plant for these purposes will be concentrated on this floor. One new dresser has been added in this department. A concrete floor has been put in the basement and this room will be used for finishing. A new hydro-extractor has been installed in this department. By this arrangement the dressing, spooling and finishing will be done in the mill recently purchased, while the carding and spinning will be done in the old building. There will be ample room for additional machinery when all these changes are completed.

*Georgia, Smyrna. Negotiations for the Concord Woolen Mills by A. T. Cox Co. of Atlanta have been completed and they will take over the business at once. The A. T. Cox Co. has under consideration plans for adding to the capacity of the mill.

Michigan, Kalamazoo. The Kalamazoo Blanket Mills, manufacturers of horse blankets, are constructing an enlargement to their plant.

Minnesota, Fergus Falls. The Fergus Falls Woolen Mills Co. has awarded contract for an addition which will cost about $3,000. This company succeeded the old Fergus Falls Woolen Mills several months ago and at that time reported that they would add a knit underwear department. I. J. Boyun, manager and buyer of the concern, was formerly connected with the Fergus Falls Knitting Works, but withdrew to devote all of his attention to the Fergus Falls Woolen Mills Co.

New Hampshire, Marlboro. Electric power is being installed by the Monadnock Blanket Mills as an auxiliary to the water power at the lower mill. The upper mill has steam auxiliary to water power. In addition to this improvement, five 96 inch, 25 harness, box looms are being installed.

*New York, Amsterdam. Construction work has been started on the addition to the plant of McCleary, Wallin & Crouse, Inc. It will be 4 stories high, 30 by 260 ft., and as noted previously, will be equipped with 12 sets, 60 inch cards and 2,000 wool spindles.

*Pennsylvania, Chambersburg. A lease of the Chambersburg Woolen Co.'s plant has been secured by the Melville Woolen Co. for one year from Sept. 1 with the privilege of buying, and it is probable some changes will be made. The Melville Woolen Co.'s plant at Fredericksburg, Va., was destroyed by fire, as noted, only the pants department being saved. Five sets of cards and 25 looms will be operated at Chambersburg.

Pennsylvania, Philadelphia. Fifty thousand dollars is to be expended by William F. Read & Sons Co. on a new addition to their large mill at 12th and Jackson Sts. The operation will consist of a 5-story brick and concrete weaving shed, 35 by 200 ft., and will be started at once. They are manufacturers of silk and wool dress goods and are now operating 428 looms on this class of fabrics, which they sell direct through their main office in this city and in their New York salesrooms.

Pennsylvania, Philadelphia. The Model Mills Co., with capital of $250,000, Thomas Boggs pres., Samuel R. Boggs vice-pres., Louis G. Greene secretary and manager, and George W. Boggs treas., are equipping three floors of their large five-story new brick and concrete mill at Westmoreland and Kensington Ave., with 50 looms, on which they will manufacture Wilton, Brussels and Ingrain carpets and rugs. The mill is operated and lighted by electricity and is one of the most up-to-date in the Kensington section.

Pennsylvania, Philadelphia. The J. R. Bunting Co., with a capital of $100,000, L. F. Graff, pres., and W. H. Rogers treas. and supt., operating 1 garnett, 3 pickers and 1 willow on felt mattresses at 532 to 536 South Third street, are arranging for the erection of a new building in the rear of their present plant, to be located at American and Locust Sts. Contractors are now figuring on same.

Pennsylvania, Philadelphia. The Wabash Mills Co., Nixon St., above Leverington Ave., Manayunk, whose plant was partly destroyed by the falling of a large tank from the top of their building, are arranging for the rebuilding of the front portion of the mill, which it has been necessary to tear down. The operation has already been commenced and will cost in the neighborhood of $12,000. New machinery will also have to be added, as the old equipment was destroyed. They

are manufacturers of carpet and blanket yarns and wool spun cotton yarns in skeins and tops.

Pennsylvania, Philadelphia. Jonathan Ring & Son, Inc., has awarded contract for a 2-story addition, 300 by 60 ft.

*West Virginia, Keyser. Contract has been awarded by the Patchett Worsted Co. for the sprinkler system to be installed.

Mills Starting Up.

Maine, Skowhegan. Manufacturing was resumed about three weeks ago in the Marston Worsted Mill. A meeting of stockholders will be held shortly to elect officers.

SILK.

New Mills.

*New Jersey, Passaic. The Dundee Silk Thowing Co., recently incorporated, has organized with Samuel Birnbaum as president, treasurer, superintendent and buyer, and manufacturing will be started in Passaic, about November, with 7,000 spindles. The previous report that Robert Speirs of the Spiers Silk Co. controlled the Dundee Silk Throwing Co. is incorrect. Mr. Speirs simply holds one share of the stock and acts only as an adviser.

New Jersey, Paterson. Siff & Cohen, who operate a broad silk plant in the Reinhardt Mill No. 1, have ordered 120 new looms which will be installed in Mill No. 2 at an early date.

*New Jersey, Paterson. The new silk mill started by Joseph Fortinsky will be operated under the style of the Newark Silk Co. in the Sowerbut Mill. Twenty looms will be operated on broad silks, beginning operation Sept. 27. Mr. Fortinsky was formerly connected with the Manhattan Silk Co.

New York, New York City. A. and M. Levy, whose plant, the Manhattan Ribbon Co., Paterson, New Jersey, was recently destroyed by fire, as noted, have started manufacturing at 124th St., and First Ave., New York City, with 30 ribbon looms. Warping machinery and other auxiliary equipment recovered from the fire in Paterson will also be installed to balance the installation. They are operating under the name of the Arlington Silk Co.

*Pennsylvania, Forest City. Silk throwing machinery is being installed in the new branch mill of the Klots Throwing Co. Their main plant is at Scranton. New York office is at 487 Broadway.

*Pennsylvania, South Bethlehem. The Wyandotte Silk Mill at Northampton Heights is completed and the final preparations are being made to begin manufacturing. The building is 50 by 150 ft., 2 stories and basement, of brick construction and was designed by Herman Seltmann, vice-president and manager of the company. 8,000 spindles for commission silk throwing have been installed. Mr. Seltmann was formerly connected with D. G. Dery's silk mill at Catasauqua.

Pennsylvania, York. E. & H. Levy of New York, silk manufacturers, have arranged with the Chamber of Commerce to establish a ribbon factory here which will give employment to 400 operatives. The main office of E. & H. Levy is located at 72 Greene St., New York.

Enlargements and Improvements.

Connecticut, Middletown. Cheney Bros. of South Manchester, Conn., have leased the mill of the York Silk Mfg. Co. at Middletown, formerly known as L. D. Brown & Co.'s mill. Part of the mill will not be operated by them and for the present at least they intend to run only the weaving department, which contains about 265 looms, shipping warps from South Manchester. Cheney Bros. consider the arrangement a temporary one. All business in connection with this branch will be transacted from the office at South Manchester. No new machinery will be required.

*Connecticut, Willimantic. Contract has been awarded by the Windham Silk Co. for the erection of their new 3-story mill to the J. W. Bishop Co. Work will be started immediately and it is expected outside work will be completed by Dec. 1. The wooden structeure which at present occupies the site of the proposed new mill at Valley and North Sts., is to be removed.

New Jersey, Newton. Plans have been prepared for a dye house for the Valentine & Bentley Silk Co., which will be 110 by 50ft. when completed. Preliminary construction work has already been started.

Pennsylvania, Darby. The Griswold Worsted Co. has resumed the manufacture of Tussah silk which was discontinued several years ago. Machinery for the manufacture of silk is being installed in that part of the plant which was formerly the silk mill. The worsted department is being operated on mohair yarns.

Pennsylvania, Mayfield. An enlargement is to be built to the plant of the Mayfield Silk Co., Inc., which will double the present capacity. A new power plant also is to be constructed. Plans have been prepared by Architect Dixon of Scranton. About $40,000 will be expended.

*Pennsylvania, Scranton. W. A. Lush Silk Co., recently reported building an addition, have completed this enlargement and machinery is now being installed.

MISCELLANEOUS.

Connecticut, Bridgeport. Construction work has been started on an addition to the plant of Alb. & E. Henkels to be used for the manufacture of torchon laces. The contract calls for the completion of the building early in November and it will be equipped by the middle of November. This addition will practically double the capacity of the plant.

*Connecticut, Norwalk. Machinery is being installed for the Dresden Lace Works, the new company which will occupy the addition recently built for the Muller Gloria Mills.

Personals.

Charles F. Tripp has accepted the position as overseer of spinning at the Chas. J. Amidon & Son mill, Hinsdale, N. H. He comes from Bridgton, Me.

Alfred Goodwin, superintendent of the yarn department at the Orr Felt & Blanket Co., Piqua, O., has severed his connection with that company.

Henry Tilson, overseer of dyeing at the Aetna Mills, Watertown, Mass., has resigned and is succeeded by Alfred Peplar, who formerly held this position for a great many years.

A. E. Forward, overseer of carding at the So. Acton Woolen Co., So. Acton, Mass., has been promoted to the position of superintendent.

J. P. Ryan, overseer of finishing at the Kennebec Mills, Fairfield, Me., has severed his connection with that company and has accepted a position with the Berkshire Woolen & Worsted Mills, Pittsfield, Mass.

Wm. Bushman has been appointed overseer of the winding department at the Sulloway Mills, Franklin, N. H. He succeeds Mr. Clark, who has resigned.

Herman Andrews has been engaged as overseer of drawing at the Harrison Yarn & Dyeing Co., Pawtucket, R. I. He was formerly engaged at the Atlantic Mills, Providence, R. I.

Joseph E. Earnshaw, assistant engineer at the Fisher Mfg. Co., Fisherville, Mass., has resigned, to accept a similar position at Woonsocket, R. I.

John Dauber, Jr., has accepted a position as assistant mechanic at the United States Finishing Co., Norwich, Conn. He was formerly employed in a similar position at the Manville Co., Manville, R. I.

Walter C. Hadley has been named as successor to Harry B. Harley as superintendent of the American Printing Co., Fall River, Mass. Mr. Hadley was formerly head designer at this company and has been in their employ for 25 years.

Joseph R. Glennon, superintendent of the New Bedford Spinning Co., a branch of the N. E. Cotton Yarn Co., has severed his connection with that firm.

Kirke N. Roberts, for some time past in the employ of the Taunton Knitting Co., Taunton, Mass., is to represent them on the road as traveling salesman.

Arthur E. Thomas, superintendent of S. Lennard & Sons mill at Dundas, Ont., Canada, has severed his connection with that company, to accept a similar position with Princess Underwear, Ltd., Hamilton, Ont.

Daniel P. Clark has been appointed superintendent of the Felters Co., Millbury, Mass., formerly known as the Bowden Felting Mills Co. He succeeds Albert H. Hyde. Mr. Clark has been in the employ of this company a great many years.

W. F. Campbell, formerly assistant overseer of spinning at the Patterson Mfg. Co., Kannapolis, N. C., has been appointed overseer of spinning at the Wennonah Mills, Lexington, N. C.

Thomas W. Harvey, for the past three years superintendent of the Prattville Cotton Mill, Prattville, Ala., has resigned.

J. C. Keller, formerly superintendent of the Lula Mfg. Co., King's Mountain, N. C., has taken charge of the carding department at the Dan River Cotton Mills, Danville, Va.

D. E. Edwards has been appointed superintendent of the Prattville Cotton Mill, Prattville, Ala., in connection with being overseer of weaving. He will have charge of the interior of the mill.

J. H. Hines, formerly superintendent of the Merrimack Mills, Huntsville, Ala., has accepted a position with the Mayes Mfg. Co., Mayesworth, N. C., as superintendent.

F. C. Craddick has resigned as superintendent of the Dickson Mill, Laurinburg, N. C., and will devote all of his time to the Waverly and Scotland Mills.

J. W. Brown, who for several years has been superintendent of the Cowpens Mfg. Co., Cowpens, S. C., has been promoted to the presidency of the same, succeeding his father, R. R. Brown, recently deceased.

W. R. Brown, master mechanic at the Clinton Mill, has succeeded Mr. Loflin as superintendent of the Lydia Mill, Clinton, S. C.

T. L. Clark, for many years superintendent of mills in Texas, has accepted the superintendency of the new mill at Albany, Ga.

George Bliss has accepted the position as overseer of finishing at the Earnsdale Worsted Mills, Clinton, Mass. He comes from the Beoli Mills, Fitchburg, Mass.

It is reported that R. G. Reilly, who recently took the position of superintendent of the Gosnold Mills, New Bedford, Mass., will be given the position of agent recently vacated by Geo. H. Booth and that Charles P. Moody, at present overseer of the carding department, will be promoted to the position of superintendent, left vacant by Mr. Reilly's change.

James Adams, superintendent of the Gosnold Mills, New Bedford, Mass., was presented with a handsome diamond ring by the help employed under him, when he severed his connection with the mill. Mr. Strongman, agent and treasurer of the mill, made the presentation speech. Mr. Adams was very much surprised, but in accepting the ring he urged the overseers and employes to work as faithfully for the new superintendent as they had for him.

John T. Ryan, for four years employed as overseer at the Union Mills, Taunton, Mass., has been transferred to the mills of the same company on Ingell St.

John A. Owen, who for over thirty years has been connected with the Ashland Cotton Co., Jewett City, Conn., as bookkeeper, paymaster and in latter years as its secretary, has tendered his resignation. His successor will be Louis Carpenter of Norwich, Conn.

George Wilson, superintendent of the Dominion Textile Co., Windsor, N. S., Canada, has severed his connection with that company.

Paul A. Schwartz has been appointed designer for A. L. Sayles & Sons, Granite Mill, Pascoag, R. I. Mr. Schwartz formerly held this position, but some time ago entered the employ of the Concord Mfg. Co., Penacook, N. H.

Jos. Dudley has accepted the position as overseer of ring spinning and spooling at the White

THE FOREMEN AND SECOND HANDS OF THE BOSTON MFG. CO., AT WALTHAM, MASS.

Top row standing, left to right—John Keough, second hand at No. 3 Weave Room; Alfred Olsen, second hand at No. 4 Weave Room; Elmer Saulneir, boss weaver; George Jones, consulting engineer; Geo. Parmenter, Jr., boss colored room; Frank Lowell, boss comber room; Wm. Begley, second hand of spooling; Timothy Connolly, boss carder; Thomas Kelley, second hand twisting; Timothy Keena, boss quiller. Second row, standing—William Powers, second hand cloth room; James McQuestion, boss finishing room; Patrick Kelley, second hand finishing room; Joseph Greenwood, second hand machine shop; Paul Burke, boss of spooling; John Boland, second hand finishing room; Wm. O'Hearn, second hand of slashers; Frederick Starr, second hand mule spinning. Second row, seated—Richard Walworth, boss mule spinning; Daniel Carey, boss dyer; William Dyer, boss ring spinning; Christopher St. George, master mechanic; Jeremiah Rearsley, boss carpenter; Fred Libby, boss slasher room. First row, seated—John Gaynor, second hand of card room; James Borous, second hand ring spinning.

W. Y. Harrison, superintendent of the Calhoun Mills, Calhoun Falls, S. C., has resigned. He will take charge of the new Panola Mill, at Greenwood, S. C. He was presented with a gold watch by his employes as a token of their esteem.

F. C. Howell, overseer of weaving at the Glen Raven Mills, Burlington, N. C., has resigned to accept a position with the Eno Cotton Mills, Hillsboro, N. C.

G. B. Crosby, overseer of the cloth room at the Saxon Mill, Spartanburg, S. C., has resigned to accept a similar position with the Osage Mill, Bessemer City, N. C.

Weldon Bridges has accepted a position as overseer of carding and combing at the Wiscasset Mill No. 4, Albemarle, N. C. He comes from the Elizabeth Mill, Charlotte, N. C.

Rock Mill, White Rock, R. I., succeeding George Goff.

Peter Touchett has accepted the position as overseer of carding at H. T. Murdock & Co., Proctorsville, Vt., succeeding C. T. Booth.

A. S. Pratt has been appointed superintendent of the Edgemere Mfg. Co., Great Barrington, Mass. He was formerly employed at the Edwards Mfg. Co., Augusta, Me.

Charles F. McGill has accepted the position as overseer of finishing at the Kennebec Mills, Fairfield, Me. He comes from the Pondicherry Co., Bridgton, Me.

Charles Walcott, treasurer of the Newmarket Mfg. Co., Newmarket, N. H., has been appointed treasurer of the Atlantic Cotton Mills, Lawrence, Mass., succeeding H. B. Richardson.

Albert Gill has been appointed superintendent and designer at the Colwell Worsted Mills, Providence, R. I. He was at one time employed at The Empire Cloth Mfg. Co., Philadelphia, Pa.

W. T. Waterhouse has accepted the position as overseer of carding at the Kennebec Mills, Fairfield, Me. He comes from the Brown Mills, Dover, Me.

W. H. Hassett has been appointed superintendent of the Springfield Blanket Co., Holyoke, Mass., succeeding Walker Ainley.

W. H. Gibson, Jr., has accepted a position as overseer of weaving at the new Alice Mills, Easley, S. C. He comes from the Monaghan Mills, Greenville, S. C.

Thomas D. Crumley, formerly of the Globe Mill, Wonsocket, R .I., has accepted a position as second hand in the spinning department at the Grosvenordale Co., No. Grosvenordale, Conn.

C. M. Elliott has been appointed overseer of finishing at the Faulkner & Colony Mfg. Co., Keene, N. H. He comes from Racine, Wis.

Charles Pellerin has been appointed master mechanic at the N. D. White & Sons mill, Winchendon Springs, Mass. He comes from the Amoskeag Mfg. Co., Manchester, N. H.

Walker Ainley, superintendent of the Springfeld Blanket Co., Holyoke, Mass., has severed his connection with that company on account of ill health. Mr. Ainley has been in the employ of this company for a great many years.

Mathew J. Fagan has been appointed overseer of finishing at the Massachusetts Reformatory, Concord Junction, Mass. He was formerly employed at the C. A. Root Co., Uxbridge, Mass.

John F. Miller, overseer of carding at the Merchants Mfg. Co., Fall River, Mass., has been appointed superintendent of the Silver Lake Co., Newton, Mass.

Chas. H. Boyd, overseer of carding at the Mayes Mfg. Co., Mayesworth, N. C., has resigned and has been appointed superintendent of the new Jewell Mill, Thomasville, N. C.

W. W. Owens has taken charge of carding and spinning at the Wennonah Mills, Lexington, N. C. He comes from Charlotte, N. C.

W. N. Phillips has been promoted from second hand to overseer of carding at the Otteray Mills, Union, S. C.

W. T. Hall, from the Bellwill Mill, Wilmington, N. C., has resumed his old position as overseer of weaving at the Ossipee Mills, Elon College, N. C.

J. B. Loflin, superintendent of the Lydia Mills, Clinton, S. C., has resigned on account of a complete breakdown of his health.

T. M. Crocker has resigned as overseer of carding at the Clinton Cotton Mills, Clinton, S. C., to accept a similar position with the Newberry Cotton Mills, Newberry, S. C.

David Harrison, Jr., has been appointed overseer of carding at the Clinton Cotton Mills, Clinton, S. C. He comes from Greenville, S. C.

J. L. Kerley has been appointed overseer of carding at the Ossage Mfg. Co., Bessemer City, N. C. He comes from the Anchor Mills, Huntersville, N. C.

James J. Burns, formerly employed at the Earnsdale Worsted Mills, Clinton, Mass., has accepted a position as overseer of finishing at the Narragansett Worsted Co., No. Oxford, Mass.

F. O. Benson, overseer of dyeing at the Mohawk Valley Cap Factory, Utica, N. Y., has severed his connection with that company.

Frank Harvey, for a number of years overseer of finishing at the Sawyer Woolen Mill, Dover, N. H., and who left their employ some years ago, has again entered their employ as overseer of finishing, now being owned and operated by the American Woolen Co.

DEATHS.

Wm. T. Galey, president of the Aberfoyle Mills Corp'n, Philadelphia, and senior member of the firm of Galey & Lord, selling agents of New York City, died at his home in that city at the age of 50 years. He is survived by a wife and several children.

Wm. Strickland, overseer of the drawing and spinning department at the Queensbury Mill, Somersworth, N. H., died suddenly at his home in that town, September 2, at the age of 49 years. The cause of his death was ptomaine poisoning. Mr. Strickland had worked Wednesday afternoon and was not thought seriously ill until an hour before he died.

Albert T. Trudelle, 19 years old, was scalded to death Monday morning, Sept. 12, while at work in the engine house at the Whittenton Mills, Taunton, Mass. Trudelle, who was one of the assistant engineers, went into a room to turn on the steam into a blower engine when the steam pipe burst, filling the room with live steam. He was terribly scalded, but ran out of the room and up a corridor to the outer door of the engine room, where he fell dead.

James Malone, overseer of the mule spinning department at the Lockwood Mills, Waterville, Me., died suddenly at his home. He had been in good health and his sudden death was a great shock to all who knew him.

W. J. MacFarlane, overseer of dyeing at the Webster Woolen Mills, Sabattus, Me., died while on a trip to New York City. He is survived by a wife and one son.

Hugh Parks, Sr., president of the Franklinville Mfg. Co., Franklinville, N. C., died at his home at the age of 84 years. He had been in poor health for several years, but was not considered dangerously ill until a few days before he died. He had been engaged in the cotton business since 1858 and is survived by a son, Hugh Parks, Jr., who is secretary and treasurer of the Franklinville Mfg. Co.

New Publications.

[Any work noticed under this head can be obtained through the office of this journal.]

The Textile Industry; by Prof. Max Guertler and Dr. William Massot; 134 pages per volume, 4 by 6; G. J. Goeschensche Verlagshandlung, Leipzig, Germany. Price per volume 50 cents.

We have received the first three booklets of a series dealing with different branches of the textile industry in a manner suitable for the general reader. The author has confined himself chiefly to the processes and products of the industry, omitting detailed descriptions of the machinery and giving illustrations of only such machines as are necessary for an understanding of the text. The plan and object of the series are in every way commendable and we hope that the example will be followed in English books on textiles. The following is an abstract of the contents of the first three books, the text being in German:

Vol. 1, by Prof. Guertler: Textile fibers, cotton, flax, hemp, jute, ramie, wool, mohair, camel hair, shoddy, natural silk, mineral fibers. Spinning of cotton, cotton waste, flax, tow, hemp, jute, carded woolen yarn, worsted yarn, silk waste, artificial silk, paper yarn. Packing yarn. Finished yarn.

Vol. 2, by Prof. Guertler: Weaving, knitting, passementerie, lace curtains and felts.

Vol. 3: Washing, bleaching and dyeing, by Dr. Wilhelm Massot; chemicals, mordants and dyestuffs; washing, bleaching and dyeing textile fibers.

Work, Wages and Profits; by H. L. Gantt; 194 pages, 5 by 7 1/2; The Engineering Magazine. Price $2.00.

This book is the outgrowth of various papers and lectures on labor management, a question to which the author has given years of hard study. First comes a chapter on The Application of the Scientific Method to the Labor Problem, a paper read at the St. Louis Exposition in 1904. This is followed by The Utilization of Labor, a lecture before the students of the Stevens Institute of Technology; the Compensation of Workmen; Day Work; Piece Work; Task Work with a Bonus; Training Workmen; Fixing Habits of Industry; and Profits. The last chapter is based on a paper read before the National Association of Cotton Manufacturers in April, 1910. The reader will find Mr. Gantt's theories and experience set forth in great detail in these chapters, probably in much greater detail than the average manufacturer will be willing to carry into his mill practice. The book will repay study and give the mill man many valuable suggestions for increasing the efficiency of the workers.

Journal of the Manchester Textile Society; Vol. 2; Manchester (Eng.) Municipal School of Technology. Price 5s.

The second volume of this Journal contains the following articles: Ring Spinning at Continuously Varying Speeds, by G. H. Cooke; The Textile Industry in Hungary, by J. Bolgar; Mill Organization, by J. Crompton; The Evolution of the Power Loom, by Prof. T. W. Fox; The Lancashire Loom vs. the Northrop Loom, by John M. Hey; The Preparation of Cotton for Fine Spinning, by Norman Jones; Designs for Dobby and Jacquard Fabrics, by A. E. G. Brookes; High Pressure Gas Lighting in Textile Mills, by Charles Walton; Ornament in Historic Textile Fabrics, by Henry Cadness; The Child-Labor Problem, by T. L. Roberts; Crossed Warp Effects, by W. W. Marland; Communication: "Thin Place" Feeler, by H. R. Turner; Communication: The Effects of "Gain" in Mule Spinning, by the evening students.

The Textile Industries; by William S. Murphy, assisted by leading experts in Textile Technology; The Gresham Publishing Co., 34 Southampton St., Strand, London, Eng.; 180 pages per vol., 6 1/2 by 10. Price per vol. $3.00.

This is a work worthy of the great industry of which it treats. Three volumes are now ready and it is expected the other five will appear at the rate of one every three months. The aim of the author has been to adapt it to the requirements of the general student as well as to the needs of the mill man. The entire work will form a complete account of all branches of the textile industry. The first three volumes comprise the three parts dealing with textile fibers, the preparation of textile fibers, carding, combing, drawing and spinning, the last named part extending into the fourth volume. The volumes are well printed and bound, and would in every respect be a valuable addition to any private or public library. The three volumes now ready can be seen at our Boston office.

Guide and Directory of Embroidery Industry; by Oswald Mayer, 504 Shippen St., West Hoboken, N. J.

This directory, known as the O K Guide of the Embroidery Trade, contains a list of the embroidery manufacturers in the United States and Canada, giving details of the plant, including the number and character of the machines. It is divided into two sections, the first containing the directory of shuttle machine embroidery establishments and the second directory the hand machine establishments. Nearly 500 firms are listed in the two sections. It is estimated that about 8,500 employes find work in this branch of the industry. It centers largely in New York, New Jersey and Pennsylvania. They intend to publish the book annually hereafter. Price is $1.00.

The Textile Institute Journal; 36 pages, 6 by 9 3/4; George Moores, Secretary, 46a Market St., Manchester, England.

The first issue of this journal begins with an historical sketch in which the development of the Textile Institute is traced from its beginning on Sept. 11, 1907, when J. H. Lester, M. Sc., and George Moores, F. R. S., both of whom are well known to our readers, discussed the work of the International Association for Testing Materials, whose convention at Brussels they had recently attended. The Journal gives an account of the aims of the Institute, and a report of the proceedings at the inauguration on April 22, 1910. This is followed by a list of the officers and foundation members.

Business Literature.

The Saco & Pettee Roving Frames; The Saco & Pettee Co., Newton Upper Falls and Biddeford, Me.

This is a very attractive catalogue describing the improved roving frame built by the Saco & Pettee Co. The design of the new frame has been revised throughout with the object of increasing the efficiency and ease in operation. The parts of the frame are machine tool finished and interchangeable, a feature that will be greatly appreciated by manufacturers. There are now 2,000 of the improved roving frames in operation and actual as well as prospective users will find the catalogue of value because of the rules for making calculations and the yarn and twist tables which are included in the volume.

National Motor and Belt Driven Air Compressors; The National Brake & Electric Co., Milwaukee, Wis.

A 68 page catalogue containing much useful information regarding the adaptability of compressed air for industrial purposes, together with an illustrated description of the various types of National air compressors manufactured by the National Brake & Electric Co. Few manufacturers have familiarized themselves with the uses of compressed air and yet it is an important development which offers great possibilities in industrial fields.

Yale Door Checks; Yale & Towne Mfg. Co., New York and Stamford, Conn.

This is a 40-page catalogue illustrating and describing the extensive line of door closing devices manufactured by the Yale & Towne Mfg. Co. They include several improvements that our readers should investigate.

The Gilbert Wood Split Pulley; Saginaw Mfg. Co., Saginaw, Mich.

An attractive pamphlet of 39 pages containing an illustrated description of the Gilbert wood split pulley.

"Power Control"; The Woodward Governor Co., Rockford, Ill.

We have received the August issue of "Power-Control" published by the manufacturers of the Woodward governors. An interesting feature is a history of the Woodward Governor Co. from its organization in 1870 to the present time. This includes three views of the Woodward plant at different periods in its history, in 1873, 1893, and at the present time, showing clearly the great development that has resulted from a small beginning. Those interested in this subject will be placed on the mailing list upon request.

The Burt Oil Filters, Exhaust Heads and Ventilators; The Burt Manufacturing Co., 432 Main St., Akron, O.

This is an attractive catalogue of 111 pages describing the various products of the Burt Mfg. Co., including oil filters, exhaust heads and ventilators.

Rice & Sargent Corliss Engines; Providence Engineering Works, Providence, R. I.

This is a new 55-page bulletin showing a number of installations of the Rice & Sargent's Corliss engines. It describes and illustrates the construction in detail, especially those features enabling engines to be operated at high speeds. There are also data regarding floor space, horse power ratings, rope driving, etc. The bulletin will be of interest to all power users. Copies will be forwarded on application.

High Pressure Blowers, Catalogue No. 175; B. F. Sturtevant Co., Hyde Park, Mass.

A 42-page pamphlet illustrating and describing various types of high pressure blowers manufactured by this well known company. The catalogue gives a detailed account of the construction and operation of blowers and contains many excellent illustrations.

Saving Made in Boxes.

A great many manufacturers of textile products buy their boxes made up by local concerns, without apparent realization of the amount to be saved by buying the boxes in shook form. The shook is the box in knocked-down form. Being shipped in car lots they are very much cheaper than the made-up boxes, inasmuch as the local manufacturer of made-up boxes has to pay a higher freight rate on his material, which comes in the rough, and the loss in the manufacture of the made-up boxes is no small item, all of which the consumer pays for in the end.

Again, the manufacturer of made-up boxes, buying in small quantities, has to pay a much higher price for his rough stock.

One of the largest manufacturers of box shooks, crating materials, cloth boards, etc., viz: the Peart, Nields & McCormick Co., 15th and Market Sts., Philadelphia, believe that there is an opportunity for textile manufacturers to save a great deal of money in this direction and in their advertisement, which appears on another page in this issue of the Textile World Record, they point out some of the advantages of buying direct from the manufacturer. Their mills are located right in the territory of the standing timber, which they claim gives a saving in freight alone of better than $2.00 on each thousand feet of lumber. They invite correspondence with manufacturers and will be pleased to advise them just what the saving will be on the amount of material in this line they are using.

The Arabol Mfg. Co.

Finishing compounds of tried excellence for bleaches and print work, as well as cotton piece goods are made in great variety by the Arabol Mfg. Co., 100 William St., N. Y. City, who make a specialty of sizings and finishing compounds and alizarine assistants, for the use of textile manufacturers. The latest addition to their staples is Bellicosa, a new and efficient sizing material.

Geo. D. Mayo Machine Co.'s Outing.

The employees of the Geo. D. Mayo Machine Co. of Laconia, N. H., recently enjoyed their fourth annual outing at Lake Shore Park, about six miles distant from Laconia.

Nearly 350 were in the party that made the trip on the steamer Gov. Endicott, especially chartered for the occasion. They were very fortuate in having a beautiful day and the trip on Lake Winnepesaukee to the Park was not the least pleasant feature of the occasion.

On arrival at the grounds the program, consisting of twenty different athletic events, was successfully carried out. Different floors in the works were matched against one another and were victorious in the order of first, second and third floors. Sports included canoe races, land races, jumping, tug-of-war, etc. Dancing was provided for those socially inclined.

At four o'clock they boarded the steamer for a beautiful two hour sail among the islands of the lake.

The entire expense of the outing was borne by the company, including the dinner in the pine grove, music and the steamer. This has been their custom since this outing feature was inaugurated.

In spite of the depression that has been felt in some branches of the knitting business, this company has made a record output of the new Mayo full automatic knitters. Last year they sold 2400 of the new model machine and up to September 1st of this year they sold over 1500 machines.

Notice of Removal.

The National Association of Manufacturers, of which John Kirby, Jr., is president, has removed its general offices from 170 Broadway to 30 Church street, one of the twin Hudson terminal buildings. The association's growth during the past few years necessitated more commodious quarters than could be obtained at the Broadway address The new location is adjacent to steamship piers, and is directly connected by tunnel with the great railway systems of the country.

The many visitors from abroad, buyers and importers, who make their headquarters with the association, can now go direct from their steamers to the general offices, and the three thousand members, located in every state, are equally benefited through the direct connections of the Hudson tunnels.

The editorial and advertising departments of "American Industries," the Association's official magazine, and of "Export American Industries" (English and Spanish editions), have also been removed to the new location.

The Royersford Foundry & Machine Co., manufacturers of the Sells roller bearing, have opened a European branch with Theodore Butter, Ltd., 149 Queen Victoria St., London, England, to meet the increasing demand for Sells roller bearings in Europe.

A New Club House.

The Southern Manufacturers' Club of Charlotte, N. C., formally opened their new club house Thursday evening, Sept. 29. The occasion was a most enjoyable one and in its new home this important organization will be of greater service than ever in looking to the comfort and well-being of its members.

The Mansfield Bleachery.

A bleachery equipped with the most improved machinery and appliances has recently been started at Mansfield, Mass., the principal owners being the Messrs. Bannon, who have been associated with the Saylesville Bleachery and other large dyeing, bleaching and finishing plants.

The building occupied by the new company was formerly used by the Crossley Print Works. It is situated on the main line of the New York, New Haven & Hartford Railroad, and is admirably located to accommodate the trade either by rail or tide water. The Crossley Building has been enlarged, additional wings added thereto and numerous improvements have been made to secure a modern structure. The important feature in the location of the bleachery is the abundant supply of water. After exhaustive tests, it has been shown to be inexhaustible in quantity, with the quality second to none in the United States for the purpose of bleaching fine white goods.

The daily output of the plant is placed at about 50,000 yards, but this can be readily increased to twice the amount as conditions demand. The management of the plant and the execution of the work is in the hands of men of long experience in old established works of this character, and the prompt production of the very best work, along the lines that are undertaken, is guaranteed.

The detail of the water supply is interesting. Both spring and pond water are available to a large extent. Besides these, a tank has been erected for fire and emergency purposes. This tank has a capacity of 50,000 gallons. The company, anticipating a good deal of singeing work, has its own gas plant. The place is equipped with the most up-to-date bleaching and finishing machinery which has been selected with care and knowledge of its utility.

The men back of the enterprise are popular in the trade. They have selected the well-known firm of Myrick & Rice, 320 Broadway, New York, for their selling agents, and that firm will be glad to furnish any information regarding price, etc. The president of the company, Patrick Bannon, is probably one of the best-known men in the bleaching line. He has been associated with the Saylesville Company for over 50 years in an expert capacity. His personality and ability as adviser is an important asset to the company. His son, William H. Bannon, treasurer and superintendent of the company, has been trained under the guidance of his father, and his knowledge of chemistry, together with his long practical experience, enables him to cope with the most critical demand.

Woolen Overseers of Maine.

The annual meeting of the Woolen Overseers' Association of Eastern Maine was held at Camp Benson, Saturday, September 10. G. A. Mabbett, the president, called the meeting to order. J. H. Parker was appointed secretary pro tem. F. W. Seavey, F. Mellor and H. Waterhouse were appointed a committee on credentials and reported favorably on the following applicants, who were admitted to membership:

Geo. L. Hunt, assistant supeerintendent of the Vassalboro Mills, North Vassalboro, Me.; Albert Bentley, Dexter, Me.; G. M. Slater, Dexter, Me.; Benj. Eyers, finisher, North Vassalboro, Me.; James Carnegie, dyer, North Vassalboro, Me.; Lloyd Sykes, designer, North Vassalboro, Me.; Howard McQuillan, John E. Ormiston.

Next in order was the appointment of a beneficiary committee consisting of the president, treasurer, secretary and resident secretary of each town.

The following officers were elected for the ensuing year:

Abel Wall, president; Irving Small, vice-president; Chas. E. Pooler, second vice-president; L. C. Sawyer, secretary; J. T. Davidson, treasurer.

It was voted to hold the next meeting at Togus, Me. The following members were present in addition to the new members elected at this meeting:

H. Waterhouse, Wm. Thompson, R. L. White, Abel Wall, C. A. Speake, J. H. Shaw, Irving Small, Percy Russell, Fred Pooler, J. H. Parker, M. C. O'Brien, G. A. Mabbett, James Morgridge, Lewis Mellor, Fred Mellor, James Lynch, A. D. Mansell, Edward Leach, W. Illingworth, J. H. Fitzgerald, J. J. King, J. T. Davidson, Wm. Emery, F. L. Cushman, F. E. Came, J. H. Davenport, A. A. Burkhardt.

Dinner was served, after which a ball game was played between two clubs composed of the weavers and spinners of the Newport Mill. The meeting was not as large as usual, but pronounced by those present as one of the best the Association has held for some time.

Peerless Gloss Mill White.

That is the name of a special white paint made by John Briggs & Co., 43 Purchase St., Boston, Mass. It is made for painting the interior of mills and factories where the requirements demand a paint that is intensely white to start with and remains so for the greatest length of time; a paint that will reflect and not absorb the light; a paint that presents a hard and glossy surface so that the walls and ceilings can be dusted, wiped or washed as desired. As this is not a lead and oil paint, it has no tendency to assume the yellow cast which destroys the radiant effect and then requires frequent renewal. Heavy body, great covering capacity, durability and extreme whiteness are the essential features claimed for this paint. It is designed particularly for mill and factory use.

Announcement.

Mr. Daniel Sharp Pratt, Jr., has this day been admitted a partner in my wool business which will be conducted hereafter under the firm name and style of Daniel S. Pratt & Company at 185 Summer St., Boston. With increased facilities, the new firm will continue the importing of South American and Australian wools, and will act as sole agents in the United States and Canada for Messrs. Engelbert Hardt & Co., Buenos Ayres, Montevideo and Punta Arenas, and for Messrs. G. Hardt & Co., Ltd., Melbourne, Sydney and Brisbane.

Daniel S. Pratt.

Boston, Oct. 1, 1910.

Good Summer Business.

The Crocker-Wheeler Co. of Ampere, N. J., have been booking a large number of important orders for electrical equipment during the summer months. In addition to some big orders in the iron and steel trade they have secured an order for one 400 k. w. direct current turbo type generator for the United States Finishing Co. of Connecticut; two 125 k. w. direct current generators for the Kilburn Mills, New Bedford, Mass.; one 200 k. v. a. Engine Type alternating current generator for Crown Mills, of New York.

A Patent Law for Holland.

Holland has had no law for the protection of patent rights since 1869, the Patents Act having been repealed in that year on the ground that patents hindered the free development of industry. The results, however, were not quite so satisfactory as were anticipated, and there has been an agitation in favor of some scheme of industrial protection for some considerable time past. A change was foreshadowered in the Speech from the Throne in 1901, and at length the matter has taken really definite shape in the new Patents Bill which will shortly come before and doubtless receive the assent of the First Chamber.

The main points of the bill are as follows: Novelty is demanded in the discovery, and will be considered lacking if the discovery should have been previously so described as to have been already capable of technical application. Instruments and machines used in manufacture are patented, as are also foodstuffs. A new material or substance is not patentable, but may be protected by patenting the method of making it. The discoverer of a patented improvement to a previous patent has the right to purchase the original patent from the holder, and this right may be enforced at law.

If the patentee takes no steps to work his patent for three years after obtaining it he may be forced to sell his rights or grant licenses, if thought desirable in the public interest, and if five years elapse and the patent is not being actually worked in Holland, it becomes invalid. The rights are granted for fifteen years. Holland being a party to the Industrial Property Convention of 1883, any applicant for a patent in some other country is now allowed twelve months for registration in Holland. —The Manchester Guardian.

Personality in Business.

A very interesting and instructive sketch of the development of the B. F. Sturtevant Co., Hyde Park, Mass., has recently been issued by that company. It deals with the real foundation of this extensive business, the personality and character of its founder, B. F. Sturtevant, and of his successor, Eugene N. Foss.

Mr. Sturtevant came to Boston fifty years ago, his assets being one idea, a patent, one model and seventy-five cents. These were his tangible assets. There was another asset often overlooked and never entered on the books, because it is intangible and we do not even know at first on which side of the ledger to put it:—Destiny. Previous to coming to Boston Mr. Sturtevant was a shoemaker in a Maine village, pegging his shoes as shoes had always been pegged, by hand. But he dreamed a dream. As he pegged away he saw the possibility of a machine that would shave a continuous ribbon of wood from the log—as tape is unwound from a bobbin—and, feeding this strip to a cutter, form each peg from the wood and drive it into the shoe at the same blow. That was the vision, and, incidentally, the shoes of civilization today are pegged in the Sturtevant way.

As the operation of some of Mr. Sturtevant's machines raised a dust which bothered the workman, and which must therefore be removed, he conceived a simple blower that should fan the dust away. Both of these ideas marked epochs in modern industry. Together they were too much for one man. He sold the pegging machine to others, in whose hands it is working today all over Christendom, and, with the profits, concentrated on his fan. There is medicine in that fact for the little men who are torn in twain betwixt two diverse activities, for, by concentrating on the fan, Mr. Sturtevant laid secure the basis of the mammoth business which he was later to develop. To wise people who never thrilled with inspiration, it seemed that B. F. Sturtevant was a visionary to try to build a business with a mechanical fan. But fortunately men of ripened wisdom alone do not run this earth. If they did, there would be no rash and visionary forays into unknown fields. Mr. Sturtevant felt that a fan tallied with sundry elemental facts. For was not the globe itself a fan, blowing the breath of life to every leaf and lung? Yes, there was good business in fans.

So Mr. Sturtevant arrived in Boston with the scanty assets of the new corporation. The principal item—the seventy-five cents—went for cabfare to carry the models of his invention to a lodging house. And now he touched the zero of the financial scale, at which point he had only two alternatives. He could remain at zero; or, given sufficient buoyancy and energy, he could rise. He rose.

A little shop on Sudbury Street, with half a dozen workmen, sufficed for a few years; but in 1876 a new shop, which was then considered large, was built in Jamaica Plain. In less than a decade this had to be more than doubled. Shortly after this Mr. Sturtevant passed away and at this point the biography might terminate. But the power and personality of Mr. Sturtevant did not terminate at this point. The personal power of a man who does things refuses to terminate and is somehow so infused into the marrow of the things he does that his work takes and holds just a lap or two in the lead; just enough to maintain—if his spirit is infused also into his successors—a definite supremacy.

The Sturtevant Company is, and always has been, an independent force in the development of its own business and of the industrial community which it serves. Nevertheless, like most concerns of similar magnitude, it shares with other New England industries a certain conjunction of interests, in the manner indicated. Its early and formative years were under the direction of its founder, Mr. Sturtevant, but its later growth has been largely directed by Mr. Foss and his associates, in whose hands it follows a course consistent with other important New England interests with which they are identified. Through such identity of direction the policies of many lines of work become parallel for the establishment of better local conditions and the insurance of industrial stability, permanence and growth. Thus no industry stands wholly aloof, and every effort made rightfully for the advancement of one, necessarily widens out to include the conditions which all other industries of the same section must face.

It is in the direct line of these efforts that Mr. Foss has been compelled to labor time and time again, not merely to build up the industrial status of the Sturtevant Company, but to obtain general conditions more reassuring for the future prosperity of the industrial community in which it is an integral part. Within five years from the enlargement in 1886 the Sturtevant works were again doubled and in 1901 a new site was chosen at Hyde Park and quickly covered with great shops and foundries, comprising at present twelve acres of floor space, with every resource for skilled and efficient manufacture.

The entire growth of the company has been a consistent evolution. Sturtevant fans required direct drive when built in large sizes, and the Sturtevant automatic engines were developed. As ventilating and draft fans—especially those in naval and marine service—must be absolutely unfailing, these engines were developed to give positively reliable and continuous service with the minimum of attention. The famous "Navy Steam Fan" was thus evolved. The success of the Sturtevant engines in such service led to their general use.

Thus also electric drive, essential for use with some kinds of fans, was developed at the Sturtevant works into the well-known Sturtevant motors, generators and generating sets. The Sturtevant steam turbine followed in due time; simple, durable, with indestructible buckets, noiseless and possessing extreme flexibility of speed and power.

Thus with the development of these various types of Sturtevant apparatus the company armed itself to attack the great basic problems of fuel economy. Mr. Sturtevant, Eugene N. Foss, who succeeded him in the management of the business, and their associates recognized that in every

power plant there was a large percentage of avoidable fuel-waste. To furnish the ideal method of preventing this loss required only the suitable application of a Sturtevant blower in connection with specially designed means for utilizing the heat saved. And thus arose the Sturtevant systems of mechanical draft and fuel economizing, together with the comprehensive series of power-generating and utilizing apparatus known everywhere today under the name of Sturtevant.

The Belgian Lace Industry.

In furnishing the following information concerning lace making and lace makers in Belgium, Consul .H Abert Johnson, of Liege, reports the present number of lace makers at 45,000 women and girls, as compared with 150,000 in 1875.

At Turnhout 2,500 lace makers produce "la dentelle de Malines," a superior article both in design and workmanship, but the majority produce "point de Paris," used for household furnishings; "point de Lille," sold in Holland and Brittany for trimming the characteristic caps worn by native women; "point de Binche," and torchon laces.

The lace makers begin their apprenticeship at 6 to 8 years of age, although the legal age limit is 9 years. Their hours are 6.30 to noon and 1 to 7 o'clock in summer, and in winter 8 a. m. to 10 p. m. They earn 8 to 10 cents a day; the more expert 14 cents. The maximum wages paid to the most skillful lace makers never exceed 30 cents a day, and out of 2,500 workers only about 20 are paid the maximum. Children up to 12 years of age, and even older, are paid 20 cents per week. Relatively to its value, the lace workers producing the Malines lace are the most poorly paid.

All lace makers are paid by the ell, the Flemish ell being 27 inches. Those working in the schools earn less than those working for a local agent or kantoor. It is largely due to the existence of intermediaries, or "middlemen," that wages are so low.

Lace schools are either maintained by religious institutions or are directed by more or less expert lace makers, who gather together the pupils, girls of different ages, in their dwellings, small workingmen's houses; added to which are the workrooms into which the children are packed. Often 70 to 100 workers are crowded into a space that would barely suffice for 20 people to move about. The rooms are not heated. At nightfall the benches are ranged along the wall, and upon small round tables a petroleum lamp is placed, with flasks of clear water arranged so that the light traverses the water and falls on the lace pillows of the workers. Lace workers attending these schools pay 30 cents a month, and the price of the thread furnished for their work is deducted from their wages.

The children employed received no instruction, the greater part not knowing how to read or write. The director of a school must turn over all work to the agent, so that sales in the open market are excluded. All work executed is usually specially ordered. All lace produced is offered for sale, whether good, bad, or indifferent, a fact that, it is claimed, has depreciated the industry and maintains the low scale of wages that prevails.

The lace maker's skill is only developed mechanically, anything like artistic training being lacking, which partly accounts for the large amount of inferior lace found on sale.

For ameliorating the condition of the lace workers and lending support to one of the oldest and most attractive of Belgian industries, a new school has been organized that will consolidate all existing schools and employ those teachers now working separately.

The Schreiner Finish.

The application of the Schreiner finish to cotton goods is greatly restricted owing to the sensitiveness of this finish to water, a few drops of rain, for example, being quite sufficient to spot the goods and render them unsightly. Considerable attention has, therefore, recently been devoted to the production of a permanent finish, and although the results cannot be described as a complete success, a few firms have certainly succeeded in obtaining a bright finish, which marks an advance as regards its water-resting properties, over the ordinary work.

The details of the process are naturally kept secret, but the essential principle is understood to be the preliminary coating of the fabric with a thin, transparent, insoluble, and adherent film, with subsequent Schreinering in the usual way. A solution of celluloid is employed, and the question of the solvent is of importance. If the ordinary solvent, a mixture of ether and alcohol, be employed the film is rather opaque, and the finish in consequence dull. The best results are said to be obtained with amyl formiate (the formic ether of iso-amyl alcohol), a satisfactory strength being about five parts celluloid in one hundred parts of amyl formiate. This is applied to the cloth by means of the ordinary spray damper, two passages over the machine being generally given, of course with a complete drying between the two operations. To obtain the best results only a very small quantity of the solution must be finely sprayed on the hard dried cloth. Attempts have also been made to employ a solution of egg albumen, but no practical results appear to have been obtained by this means.—The Manchester Guardian.

Rhode Island, Woonsocket. A new cloth washer has been installed in the Enterprise Dye Works, Mark Hough, proprietor.

Wisconsin, Milwaukee. Otto Pietsch Dye Works, 254-56 West Water St., have added a department to their general cleaning and garment dyeing business for bleaching and dyeing cotton, woolen, worsted and merino yarns. This department is equipped with three skein dyeing machines and complementary equipment. They also have installed equipment to wind and cone yarns. The company has capital stock of $50,000. A. F. Vogel is president and E. A. Ulbricht, secretary and treasurer. The cleaning and garment dyeing business was started in 1855.

Meeting of the National Association of Cotton Manufacturers.

Natural and Artificial Draft.

(Continued from page 121.)

If the chimney is above 100 feet in height, the theoretical 7 square feet requirement is still less and as I say, I never take less than 16 square feet of area, which is more than double the theoretical for 100 feet high, I consider that it is ample allowance for any overload, as well as safe and I have never found any difficulty in practice by its application.

The smallest allowable area should give the best draft, as were we to increase 20 square feet per 1,000 h. p. to 30 square feet it would mean in a travel of 150 feet distance up the stack, assuming this height, together with a flue length of 30 feet to reach its port, that we have 450 square feet of additional surface to be warmed to the same temperature of the gases with exposure to radiation loss, as well as increasing the air leaks caused by the chimney suction through flue seams and the porous bricks to this added surface. All of this excess surface put on by unneeded area is therefore making for a great detriment to the pulling force of the stack so essential for keeping down the plant investment as well as for its economy.

On the same basis of conditions as for the 100 foot stack to be used for determining the draft presure, we find that 69 cubic feet will be passed per second per each square foot of area.

Assuming then our boiler horse power requires as much as 4 pounds of coal per horse power and while theoretically 12 pounds of air needed to burn a pound of coal we will use 20, or plus the pound of coal involves 21 pounds of gas or 84 pounds gas per boiler horse power. So as the calculation at the end of this paper shows, we have therefore for 1,000 boiler horse power with a short stack of only 100 feet high, the startlingly small area of 7 square feet actually needed. If the surface friction needs to be set off, sure 25 to 50 per cent. is ample allowance, and then as you think the plant may run above rating, or increase in the future, use your judgment as to further percentage of increase to same; but do bear in mind that excess area beyond reasonable future requirements does not assist at all in pulling the needed air through the coal heaped on the grates.

Surely 4 pounds of coal per horse power and 21 pounds of gas per pound of fuel are reasonably large factors, so why such tremendous excess areas are invariably allowed, has been a puzzle to me. I suppose it is done because it is cheaper to provide more area than the needed height and therefore we see something like a 2,000 h. p. or more area with an inferior height used for 1,000 h. p. and proving in such cases that where the short stack height is a fault to begin with, it is made worse by hitching it together with an undue area. In actual practice we have seen stacks work close to their theoretical area capacity, as for instance, at Lawrence, Mass., a chimney 128 feet high above grates with flue area of 9 square feet took care of 6 Manning boilers in a satisfactory manner, developing 780 h. p., whereas the usual chimney tables recommend this size for approximately only 300 h. p.

The movement of air follows the law of gravity. So the difference in capacity between, stacks respectively 100 and 200 feet high would, therefore, be in proportion to their square roots, as 10 is to 14, which is small for such a great difference, so I ignore it altogether and taking an area that I know to be right to the smaller, which is 7 square feet theoretically and increasing this to 20 square feet for use in practice per 1,000 h. p., for any height of chimney, I know it must be even more

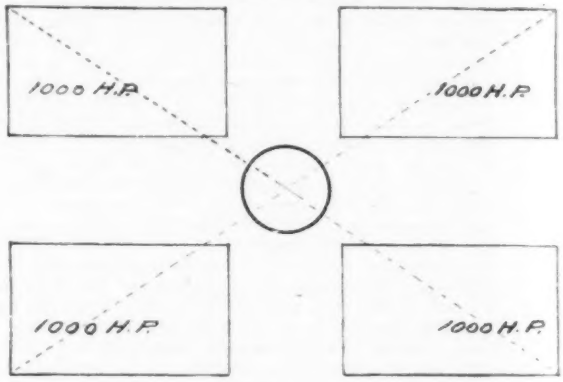


FIG. 3.

safe if there is a greater height than 100 feet. So I think I have allowed enough excess of area even if it is not as great as others use.

While I do not wish to deter those who have time and the disposition to figure a given chimney problem with accuracy, yet I believe the factors, 6/10 of an inch pressure per 100 feet of height and the area factor at 20 square feet per 1,000 h. p. for all heights will be welcome to many as safe quantities to work to in selecting the two required dimensions of a new chimney.

If you must add something for "good luck" put it on to the height, as you stand to lose less on this, as the excess area will only come useful in a long distant future when the plant has grown to it. I have seen too many plants handicapped by strained proportions for a great future, whereas when the future did arrive, it was entirely a different mill or a problem altogether dissimilar to any initial conception. In following the mill development for 20 years here in New England, it has inclined me to believe that if I had the making of any new power plant layout, it would be my purpose to plan for the highest economy for the immediate needs, not extending farther perhaps than the next five years. This burdening a new plant to struggle under heavy fixed charges and loss in operating until the work develops to meet the initial undue proportion, is as bad as buying a man's suit for a boy because you know he is going to grow to it some day. Make things of right proportions to get the best economy for what you need now, and then success brings ample capital and you can then easier afford to throw away the old plant, if you like, and start out with another

up-to-date outfit. In our conceit at any present time, we lay out big schemes for additional future boilers of the same kind in a great shed of a building and what do you generally find 10 or 15 years later but a collection of big and little units, different makes, different piping systems, etc., with the same thing seen in the engine room and elsewhere.

Before leaving the subject of natural draft I would recall the theories and formulas pertaining to this calculation to be found in a similar paper on this subject which I read before this Association in 1900, together with a table of chimney heights worked out on a basis which I purposely stretched out of reason, so they would not be used, as my object then as now, was to make the subject understandable for others to select the dimensions of height and area to suit their individual cases and to point out that no table can be made to fit any and all given amounts of horse power, as there are more important factors involved to the chimney than the mere amount of horse power.

Realizing the loss of convenience of using the chimney tables in vogue, I hope my two factors of 6/10 of an inch per 100 feet of height and 200 square feet area per 1,000 boiler horse power will prove a simple and better substitute and when used with intelligent study and tabulation for the needed height for pressure, will make your future chimneys a better investment.

In regard to the character of the chimney construction in general use, the most efficinet and handsomest, in the writer's opinion, is a well designed brick chimney with an inside core. The next selection would be a brick or a "radial brick" chimney without a core, following which would be a lined steel stack with the unlined steel pipe the lowest in order. There is another advantage besides the better retention of heat in having a core, as it can be taken out if more area is ever needed and in many cases this has been done.

Concrete chimneys are being built also, but some good engineers are afraid of them as they claim that concrete is such a brittle substance that owing to wind vibration it will certainly in time open fissures through the thin shell which will permit the entrance of moisture and combining with the sulphur gas destroy the reinforcing iron bonding the material.

To make my paper practical to the majority of my hearers who probably have chimneys already built, would say that yours is a case of studying your conditions to see what you can best get from them and suggest that you try running your plant on as few boilers as possible. I believe the result will prove decidedly advantageous. You must have the engineer interested to give it a fair trial, as it may mean a little better attention to fires to prove it out, because if you are troubled with weak natural draft you must break up the fires oftener and study closely to obtain better, intelligent and more intensified firing.

In winter, if you are troubled with poorer draft than in summer, it is due to having the boiler room too tightly closed. If the firemen object to cold drafts from doors and windows, provide the air entrance from the top of the room.

Often the wind in certain directions instead of assisting the draft makes for the contrary, which condition occurs when the wind is blowing in the same direction towards the boiler house door and this being kept open the suction of air follows along in the same direction out through same, so that the boilers nearest to the door have difficulty in getting their supply of air through the grates.

An unutilized excess of draft pressure is bad and the boilers should be fired as near the limit of draft as possible so as to prevent such excess, but there will at times be necessarily a considerable surplus pull by the wind producing a greater draft one time than another. That this excess draft is more common than otherwise is shown by the operation of the automatic regulation of dampers in the general run of plants, continually cutting off 25 to 50 per cent. and more of the available draft throughout the entire day. Of course as the plant is being run, the damper regulation makes for a great saving in preventing an undue excess of air through the grates, but it should be put to work as far as possible to produce a more intense fire and by heavier coaling to run with fewer boilers.

In this matter of draft regulation, it is much better to have a regulator that operates slowly than to have one so sensitive as to be opening and closing on a slight variation of pressure, thereby letting in an excess of air one minute, and then tightly closing, cutting off the air supply altogether, which makes for another loss to follow by imperfect combustion.

If you have such a sensitive damper, it is not necessary to throw it out, just limit your range of damper opening, so that it does not shut tight or open to its fullest extent. The regulating damper should be as near the chimney as possible, and if it were placed at the top of the chimney, it would be better yet, as in times of closing, it would hold back that much more heat. As it operates now in many plants, when the damper is closed at the port, the brick lining or core begins to lose immediately its stored up heat and the chimney cools off, then when the demand for steam comes, instead of an active chimney agent, it takes a bit of a while for it to recover its lost heat and give vigorous draft; meanwhile, the plant is held back in getting the supply of steam demanded. The condition becomes worse where the regulation is applied to dampers in the boiler uptakes, as during the time of cut off the flues have cooled as well as the chimney.

It will not be denied that any sort of a chimney gives some draft, in fact a fair draft as practice is today, but I maintain that the average draft is not up to what it might be and should be,—hence we are generally using too many boilers and firing at a disadvantage for the best economy. New boilers are purchased to get thinner fires or artificial draft installed that would be unnecessary if the chimney were properly worked out in the beginning.

ARTIFICIAL DRAFTS.

I have taken so much of your time in considering the natural draft that I must necessarily make

my remarks on artificial draft rather briefer than is proper to do justice to such an important field.

"It is frequently quoted that with mechanical draft a smaller excess supply of air than that demanded by theory is required than with natural draft. In all probability this arises from the fact that natural draft pressures are, as a rule, considerably lower than those mechanically produced, and fires are worked with less thickness with the former, so that such a thorough and uniform mixing of the coal and coal and air does not take place as with the greater pressure and thicker fires of the latter."—From the Electrical Engineer, London.

Artificial draft may be either of two systems or a combination of both, viz., the Induced Draft, Forced Draft or Balanced Draft.

The Induced Draft or Suction Draft has all the advantages of the natural draft, with the additional assurance of providing almost any positive required draft pressure that will be needed and where the plant is in its infancy it is frequently better to use an inexpensive induced draft than to incur the investment charge for a huge chimney against future needs, which are indefinite—perhaps to a remote period. While generally the cost of the induced draft is 75 to 80 per cent. less than an equivalent chimney capacity, its proportionate expense is not fixed, as the greater the chimney height, the less the induced draft equipment costs in proportion, and if foundations are particularly expensive for the chimney the relative difference in cost will become greater in favor of the induced. By using powerful fans the outlay for boiler installations can be reduced at least 25 per cent. and in one case the company I represent cut it by one-half with great success.

The maintenance of the Induced Draft is very small. If the plant is large enough to warrant using Corliss type engines, the operating expense can be maintained at less than 1 per cent. of the steam produced. In ordinary moderate sized plants the expense is never more than double this, or 2 per cent. The equipment stands up well with small risk of break-down and by attaching a pulley which can be operated by a belt from the main drive or to an electric motor, the plant is insured against shut-down without the expense for duplicate apparatus.

Induced Draft fans are usually provided with water cooled bearings to protect the babbitt from melting down, but I have known where Induced Draft fans have been used for eighteen years without any such water, in fact, the bearings probably can be kept sufficiently cool by openings in the case around the bearings, so that the cold air is drawn over same. A half inch water pipe will furnish all the water generally necessary to the largest size of induced draft fan.

The Forced Draft blows the air under the grates and the cost of operation is the same as for the induced draft, because although it has a smaller fan, the weight of air to be moved in a given time is the same as the induced draft would have to handle if used at the other end.

Balanced Draft—Wherever forced draft is used, it can be connected to operate simultaneously with either the automatic damper regulator at the chimney or the regulator operating the speed of induced draft engine. The object being to obtain a neutral or zero draft just over the fire, so that when the fire doors are opened for cooling, there is no inrush of cold air against the boiler shell, which tends to injure same as well as to spoil the economy, nor on the other hand is there any outward flame to injure the fireman or to destroy the boiler front, the latter condition being a frequent trouble to many forced draft installations.

The expense for installing the balanced draft system need be very small and its use has probably been held back by prohibitive cost for patents of doubtful merit. In many situations the balanced draft will make for improving the economy with better ease in operating the plant and as the public finds how simply the trick can be accomplished, it is certainly bound to be used to a greater extent in the future.

Abroad intensive firing is being adopted on larger scales and in the development to achieve the highest results in some of the great electrical and industrial plants, they are equipping their plants with huge thermal storage tanks in addition to their economizers. These things are bound to follow in this country as progressive boiler builders realize that whatever helps the economical production of steam is to their advantage in keeping pace with their wide awake competitors who are scientifically improving the efficiency of gas producers.

The prime movers of the plant have heretofore had the first place in attraction for study and development and thousands of dollars are spent to secure only a small economy which may be offset in the adjoining room by the firemen unnoticed. However, just as the public have had a surfeit of the moving signs in the red light district, so is coming the day when the owner will walk his visitor past the wonderful turbines into his boiler room and there throw out his chest with pride at its display of cleanliness, and its well studied features to secure all the heat possible from the fuel by its most complete utilization.

Cotton Mills of Mexico.

SPENCER JANNEY STEINMETZ, 141 Milk St., Boston Mass.

To those going to Mexico, the Hercules mills on the Mexican National Railroad, half way between Laredo and Mexico City, is the finest and best equipped. I will not burden you with a list of the mills in Mexico, as you all have complete list of them in your textile directories, but the following mills are of sufficient importance, to be affixed to this paper, as representing the flower of the cotton mills in Mexico.

Aquas calientes.

Factory of Louis Cornu. This town is noted for its shawls and blanket mills.

Parras in the State of Coahuila.

Cia Industrial de Parras. Capital, $1,000,000; 20,000 spindles and 550 looms.

Valle de Cintalapa in state of Chiapas.

Leopoldo Gout factory.

City of Mexico.

Forty mills have their selling houses in this city.
Tepeji del Rio in State of Hidalgo.
F. M. Arauna.
Guadalajara in State of Jalisco.
Campania Industriel de Guadalajara.
Lagos de Moreno in State of Jalisco.
Juan B. Rincon Gallardo.
Monterey in State of Nueva Leon.
Cantu Mills, $250,000 capital. Compania Industriel de Monterey, $400,000 capital.
Queretaro.
The Hercules Mills.
San Luis Potosi.
Hidalgo Mills.
Orizaba in State of Vera Cruz.
Compania Lda. Manufacturera de Yute, capital, $2,500,000. Compania Industriel de Orizaba, capital, $15,000,000.

It should be noted that the cotton mills of Mexico do not produce one-fifth of the cotton demanded by that country and four-fifths is imported from France, England and Germany and while I have not the exact figures of the trade we receive, it is the mouse's share, instead of the lion's share as it should be.

For the high class goods worn by the merchants and the well-to-do people, Mexico looks entirely to France and you buy in Mexico the most beautiful French ginghams, lawns, cambrics, denims and other fine cotton goods made by the splendid French mills. The heavy and coarse goods come from Germany and incidentally, may the writer ask, who is not in your line of business, but just interested in the mills from the standpoint of coal, why it is in foreign lands, that the people look to Germany for the well made, heavy and durable cotton cloth.

You will recall that a small amount of raw cotton is raised in Mexico, but not enough to supply the mills and looms of that country. It is true, that in nearly every case, the mills are equipped with machinery made in America and England and the overseers, superintendents and leading mechanics are almost wholly Americans, Englishmen or Scotchmen and in some few cases French and Germans.

The goods made are arranged from the standpoint of variety, which each country works out in good time its own problem and the writer was impressed with the fact, that the manufacturers of piece goods suit the locality to which they are sent and were shipped in tarpaulin and canvas packages in short lengths, so as to be put in the saddle packs of the mules and to be handled easily to the lighters, which come into the shallow waters of the streams to load for the steamers and even in no case were the large cumbersome, heavy wooden packages used, such as we in America pack our goods in.

While the railroads and steamships have brought the people of the world to this country, (Mexico), they have not destroyed the manner in which the Mexican people dress and the greens, browns, blues and yellows used in the ginghams gives a beautiful variety of colors and a most pleasing tone to the dress and pleasant to look upon. Most of the dyes used in the mills are fast colors and as the writer was in the East India business at one time, which business is to import indigo and cutch, he looked into the question of the permanency of the colors and found them unusually fast, which is necessary to withstand the intense heat of the tropics. The goods must be woven well in order to stand the washing in the streams as in order to get them clean, they are pounded and scrubbed against the rocks and stones and it takes good cloth to stand this hard usage and the dresses are sometimes worn for two years or more, but the natives use the same goods, (cotton) year in and year out.

The manner of baling cotton is to the Mexican mills most important, and they claim, and with some sense of being right, that Egyptian, Chinese and Indian cotton is baled at a less loss in transit than our United States cotton, which nearly always reaches them torn and gaping open from many torn places in the bagging, the hoops burst and a general forlorn, falling to pieces look to it.

The climate of Mexico is healthy, being 12 to 32 degrees north latitude, and for spinning fine yarns the dryness necessitates in all cases the use of humidifiers.

The army and navy will always buy and do buy the strongest and best goods, and herein lies our chance on our splendidly made United States goods.

Mexico exports no cotton goods and depends on imports from other nations, France, Germany and England, for over 70 per cent. of her manufactured goods.

The capital has a population of over 470,000 people, all consumers of cotton goods by the thousands and tens of thousands of yards, but alas, not the goods of the United States.

It is not only to Mexico we should send our cotton goods but nearly every nation (outside of England, France and Germany) wants them.

Just a word to touch on the reason why we should have and will have some day soon, very soon, facilities for getting our goods across all the oceans to the people who want them—is this fact clear and stern.

All other great nations have steamship lines, which have sailed out in the lanes of trade to the forty-seven nations of the globe. I beg to attach a table showing the strength of the world's shipping, and for this reason and this one only. Goods when made must be moved by rail and water. The railroad end of it we know better than any other nation on the globe, the marine proposition is not a glorious feather in our cap. You will, of course, cut out the Great Lakes shipping in the table affixed, as they do not take a yard of cotton goods to any foreign nation.

From an authoratative source the list of steam shipping of 100 tons and upwards is given as an indication of the transport facilities of various countries, and shows that the capacity of the United States sea going vessels is not any adequate proportion of its manufacturing and commercial resources.

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*Virginia, Danville. The addition being built for the Danville Knitting Mills, previously noted, is to enlarge the finishing room. No new machinery will be required at this time.

Recent Textile Patents.

BOBBIN-BORING Machine. 970,601. Luther C. Baldwin, Providence, R. I.

BOBBIN HOLDER for Spinning Spindles. 970,745. Frank Oskrit, Pittsfield, Mass.

CLOTH TENTERING Machines. Selvage Feed for. 970,697. William Evans, Kearny, N. J.

FABRIC Impregnating Apparatus. 969,041. Ernest De Journo, Allentown, Pa.

FIBROUS FABRIC. 970,950. Gustave C. Rasch, Burlington, Wis.

CLOTH-PILING Apparatus. 968,808. Samuel Sampston, Philadelphia Pa.

KNITTING MACHINE Needle and Jack Structure. 969,222. Eli Tiffany, Bennington, Vt.

KNIT DRAWERS. Ladies'. 969,808. Max Saidin, Brooklyn, N. Y.

KNITTING MACHINE. Circular. 968.563. Harry A. Houseman, Philadelphia, Pa.

KNITTING MACHINE. 970,282. Eugene Vermilyea and Ralph Hammersley, Waterford, N. Y.

LOOM Filling-Feeler. 970,644. Joshua Robinson, Lawrence, Mass.

LOOM SHUTTLE. 968,647. George A. Draper, Hopedale, Mass.

LOOM. Pile Fabric. 970,463. James Buckler, Philadelphia, Pa.

LOOM SHUTTLE Spindle. 970,516. Herbert L. Litchfield, Southbridge, Mass.

LOOM SHUTTLE. 970,763. Frank H. Stetson, Lawrence, Mass.

LOOMS. Evener Motion for Tufted Fabric. 970,613. Joseph T. Cyr, Worcester, Mass.

LOOMS. Filling Feeder for. 968,708. George A. Sontag, Clinton, Mass.

LOOM HARNESS Frame. 968,847. Hudson W. Hakes, Millbury, Mass.

LOOMS. Change-controlling Mechanism for Jacquards Employed in Automatic Weft-replenishing. 970,502. Denis M. Hollins, Blackburn, England.

LOOMS. Weft Controller for Automatic. 968,649. William D. Faulkner, Manchester, England.

LOOMS. Weft Replenishing Mechanism for Weft-replenishing. 970,591. Horace Wyman, Worcester, Mass.

LOOM SHUTTLE. 969,912. Isaac Snow and George Stubbings, Lawrence, Mass.

NEEDLES. Carriage for Tuft-yarn. 970,608. John A. Clark, Worcester, Mass.

SPINNING MACHINE. 970,203. Sebastian Siani de Ferranti, Sheffield, England.

SPINDLE DRIVING Bands. Mechanism for Guiding and Tensioning. 969,768. John Boyd, Bothwell, Scotland.

SPINNING and Twisting Frames. Latch for Cotton Ring. 969,443. John C. Ballard and John F. Bynum, Cherryville, N. C

SILK. Preserving Tin-weighted. 969,446. Olav Berg and Ma Imhoff, Paterson, N. J.

SPINNING MACHINE Spindle. 970,189. John V. Cunniff, Fall River, Mass.

SPINNING, Doubling and Twisting Machine. 970,617. Sebastian Ziani de Ferranti, Sheffield, England.

TWISTING and Cooling Yarns. Means for. 968,723. John D. Whyte, Manchester, Eng.

WOOL WASHING Machine Carries. 970,118. Frederick G. Sargent, Westford, Mass.

BED BOTTOM Fabric. 969,568. William H. Sleight, St. Louis, Mo.

Recent Textile Trade Marks Registered.

"Arrow Brand." Cotton lamp-wicking. Robert Bishop, Boston, Mass.

"Securitas." Linen and wool piece goods. Edouard Leurent, Tourcoing, France.

"Lilaine." Linen and wool piece goods. Edouard Leurent, Tourcoing, France.

"Red Man's." Hosiery. Klusewitz Bros., Reading, Pa.

"Smiling Beauty." Infants' and children's caps. A. D. Katcher & Co., New York.

"Silhouette." Hosiery. Walter Wesendonck, New York.

"Bretonne." Handkerchiefs. Brandon-Magnus Co., New York.

"Ambray." Handkerchiefs. Brandon-Magnus Co., New York.

"Erinperl." Handkerchiefs.. Brandon-Magnus Co., New York.

"Sunspun." Hand embroidery. Marshall Field & Co., Chicago, Ill.

"Pongette." Cotton piece goods. A. G. Hyde & Sons, New York.

"Big Four." Hosiery. Gehrke Knitting Mills, Reading, Pa.

"Halletta." Ladies' waists and skirts. Burnham Hanna Munger D. G. Co., Kansas City, Mo.

Pennsylvania, York. The York Silk Mfg. Co. has been declared bankrupt on petition of Attorney Geo. C. Neff of York, representing creditors. Attorney Neff was appointed receiver. The proceedings are said to be the first step toward a reorganization of the York Silk Mfg. Co. which it is said is likely to be followed by the expected reorganization of the American Silk Co.

Virginia, Williamsburg. The fluctuating price of cotton is given as the cause for the embarrassment of the Williamsburg Knitting Mill Co., which has become a voluntary bankrupt. The liabilities of the company are placed at $82,665, with assets scheduled at $113,625. H. N. Phillips and J. B. C. Spencer have been made receivers with a bond of $15,000, and will continue the business for the time being. This company has a capital of $80,000, H. S. Bird, president and treasurer, and manufactured a line of men's cotton fleeced lined underwear, operating 7 cards, 1512 mule spindles, 40 knitters and 50 sewing machines, the production being sold through New York.